EMPIRICAL ESSAYS ON EXPORT COMPOSITION AND BEHAVIOUR IN A DEVELOPING COUNTRY CONTEXT

By

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Abstract

There is a growing recognition that the composition and behaviour of exports matter for development. However, empirical studies examining these issues focus primarily on develop countries and larger emerging economies. We therefore seek to fill a gap in the literature by examining the extent and the factors explaining export specialization, the dynamics of export growth and the duration of export relationships from the perspective of a small developing country, Trinidad and Tobago, for the period, 1996-2009. These issues are particularly important for trade policy formulation and export promotion. To examine the factors explaining export specialization, we use HS 4-digit export data and conduct our estimation using mainly Fractional Logit Generalized Linear Model (GLM). To explore the factors explaining the dynamics of export growth, we use HS 6-digit manufacturing export data and estimate our model using Ordinary Least Squares (OLS) and Poisson Pseudo-Maximum Likelihood Estimation (PPML). Finally, to explain to factors influencing export duration, we also use HS 6-digit manufacturing export data and employ Stratified Cox Estimation.

We find several important results pertaining to Trinidad and Tobago's exports. First and foremost, we find Trinidad and Tobago exports are highly specialized; the extensive margin contributes substantially to export growth (for manufactured goods) and the duration of export relationships is extremely short. We also find strong evidence that Trinidad and Tobago's exports to larger markets is less specialized, increases both the intensive and the extensive margins of export growth and increases export duration. Further, we unearth strong evidence that greater distance from export markets increases export specialization, dampens both the intensive and extensive margins and reduces export duration. In addition, we find cogent evidence that regional integration with trade partners through CARICOM membership reduces export specialization, increases both the intensive and extensive margins and increases export duration. Moreover, we find some evidence that higher average tariffs of trading partners increases export specialization, reduce the extensive margin and increase export duration. Also, we discover evidence that WTO membership of trade partners increases the intensive margin and increases export duration. We also find substantial evidence that better institutional quality and governance in export destinations reduces export specialization, dampens the intensive margin but reduces export duration. Finally, our results show that the presence of Diplomatic Missions and Consulates in export markets increases the intensive margin and dampens the extensive margin. Relatedly, we find robust evidence that Trinidad and Tobago's export duration is longer, the greater the expenditure per capita on trade promotion in export markets.

Our research points to the need for the implementation of several trade policy measures to stimulate favourable changes to the composition and behaviour of exports. These measures require collaborative actions both at the regional and international to simulate more beneficial trade. They suggest the need to improve capacity among CARICOM countries to negotiate trade agreements with developed countries as well as the WTO to enable more beneficial trade to member countries. Our results also point to the need for increase spending on trade promotions and the engagement of more specialist staff to assist in trade promotions by Trinidad and Tobago's diplomatic agencies in foreign markets. In addition, our findings suggest the need for added incentives for product discovery and innovation by Trinidad and Tobago's manufacturers. Our findings could be of interest to policy makers in other small export dependent economies with economic structures very similar to Trinidad and Tobago.

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Chapter 1
Introduction

1.1 Context and Motivation

It is widely acknowledged that exports are important for economic growth and development. This is particularly true for developing countries, where exports constitute a significant portion of economic activity. For example, in the case of Trinidad and Tobago, the share of exports of goods and services in total Gross Domestic Product (GDP) for the period 2003-2009, averaged approximately 62% (World Bank, 2010). Exports are also important for economic planning and budgeting, as many developing countries predicate their annual national budgets on the expected price of their main export commodity. For example, the annual budgets of Trinidad and Tobago are usually predicated on the expected oil price for the respective years and, there are revisions to actual spending based on the actual oil price realized. Relatedly, following the tremendous success of the Asian Tigers in the 1970s and 1980s, many developing countries became deeply wedded to the idea that exports are important for growth, and many of them pursued a strategy of export-led growth. Thus, exports feature prominently as part of the overall developmental strategy in many developing countries. Also, many developing countries possess high imported raw material content in their production, and exports provide the foreign exchange to facilitate the procurement of the imported inputs for the production of other goods and services. What seems evident from the foregoing is that, many developing countries view exports as a critical control variable that can be manipulated to promote economic development.

Notwithstanding the importance of exports to economic policy formulation and overall development in developing countries, not enough is known about what influences the composition and behaviour of exports. Largely because of the absence of disaggregated data, for a long time, empirical studies focussed on aggregate exports (e.g. Pelzman and Schoepfle, 1988; Thoumi, 1989). Today, with the increasing availability of disaggregated export data, and coinciding with the development of the heterogeneous firm model of international trade following the seminal contribution of Melitz (2003), there is a rapidly growing literature that examines what explains export composition and behaviour. More specifically, the literature addresses issues such as the extent and the factors explaining export specialization, the anatomy of export growth and export duration. The growth of this literature has been fuelled to a large extent by the growing recognition that the composition and behaviour of exports have important implications for long term economic growth and development. Notably, knowledge of these issues is important as it can provide vital insight into trade policy formulation and export promotion strategies. This is particularly important for developing countries where exports represent a significant share of economic activity, and exports are critical to overall economic development strategy.

However, one fundamental problem is that the geographical coverage of the literature on the composition and behaviour of exports is inadequate. To illustrate, as it pertains to the determinants of export specialization, there are a few recent studies that examine the determinants of export specialization in the context of developing countries (e.g Sanguinetti et al., 2004; Hammouda et al., 2006; Volpe-Martincus and Gomez, 2009; Cabral and Veiga, 2010; Kim and Kim, 2012). However, the majority of these studies tend to focus on countries in Sub-Saharan Africa and South America and ignore smaller developing countries. Beyond the limited geographical coverage, these studies have largely ignored the role of non-reciprocal preferences, tariffs and institutional quality and governance in export destinations in shaping export specialization patterns. Given the critical importance of these issues to how trade policy is formulated, a study which considers these critical aspects of trade policy is warranted. As it relates to the anatomy of export growth, there have been many recent econometric studies looking at the determinants and contribution of the intensive and extensive margins to export growth (e.g Febermayr and Kholer, 2007; Amiti and Freund, 2007; Bernard et al. 2009; Crozet and Koenig, 2010; Lawless, 2010; Debaere and Mostashari, 2010; Buono and Lalanne, 2012). However, most of these studies focus on the larger developed countries and the emerging economies and to a great extent ignore developing countries. Also, the results of studies looking at the decomposition of exports into the intensive and extensive margin have been mixed with some studies (the majority) suggesting that the intensive margin contributes more to export growth (e.g Hillberry and McDaniels, 2002; Amurgo-Pacheco and Pierola, 2007; Amiti and Freund, 2007), and other studies suggesting it is the extensive margin that dominates export growth (e.g. Hummels and Klenow, 2005; Berthelon, 2011). In addition, with the exception of studies by Gamberoni (2007), Debaere and Mostahhari (2010), and Buono and Lalanne (2012), existing studies on the intensive and extensive margins largely ignore the role of non-reciprocal preferences in influencing the margins of trade. Further, although there have been some studies that look at the influence of Embassies and Consulates (economic diplomacy) on the trade margins (e.g. Volpe-Martincus et al., 2010a, 2010b; Volpe-Martincus and Carballo, 2008, 2010; Van Biesebroech et al., 2011), the geographical coverage of this literature has been limited and focuses primarily on Latin American countries and to a lesser extent on larger developed countries. Finally, the literature on the trade margins generally ignores the role of institutional quality and governance in export markets in explaining the margins of trade. We therefore seek to fill a gap in the literature by looking at the impact of a broad range of trade policy and institutional variables on the trade margins in a small developing country context. With regard to studies looking at the determinants of export duration, as in the case of studies on the trade margins, the majority tend to focus on developed countries and larger emerging economies (e.g Besedeš and Prusa, 2006a; Nitsch, 2009; Brenton et al., 2009; Fugazza and Molina, 2011; Hess and Persson, 2011; Besedeš, 2012; Shao et al., 2012). These studies also ignore the role of institutions and governance, tariffs and WTO membership of export destinations in explaining export duration. From the foregoing, what seems evident is that there is a shortage of studies looking at the export composition and its behaviour in the context of smaller developing countries. This is constraining because policy recommendations derived from larger developed countries and the emerging economies may not be an appropriate blue print for smaller developing countries. Indeed, smaller developing countries, because of their unique historical antecedence, may behave differently to developed countries and require separate empirical analyses to capture and adequately account for their unique features (Seers, 1963).

1.2 Objectives of Thesis

In this thesis, our general objective is to examine the composition and behaviour of exports of a small developing country and to identify the various factors influencing them. More specifically, we seek to measure and determine the factors influencing the extent of export specialization, the contribution of the intensive and extensive margin to export growth and the duration of export relationships. We address these issues using Trinidad and Tobago, for the period 1996-2009.

A greater understanding of issues of export composition and behaviour could be of critical importance to trade policy formulation and export promotion in developing countries. To illustrate, as it pertains to export specialization, this information could assist policy makers to design more appropriate trade policy initiatives. They may be able to identify areas of untapped export potential. In addition, information on export specialization pattern serves as an indicator of economic risk and vulnerability, in that, a high degree of specialization indicates the specific country is highly vulnerable to the vagaries of the international market. As it pertains to the trade margins, this information could provide valuable insight into the dynamics of export growth and the effectiveness of trade policy. It could also provide insight into productivity and innovation and shed light on whether countries are exploiting their comparative advantage. In addition, information on the trade margins could enable policy makers to better identify strategies to fully exploit the intensive and extensive margins. Indeed, it could shed light on whether to upgrade the quality of existing products or to expand the markets in which existing products are sold. As it relates to export duration, this information could assist policy makers to identify products and target markets that are likely to result in future export success. This information could also assist firms contemplating investment decisions to identify which products and markets to invest in. Relatedly, for the design of export-promotion policies, it is important to search for robust and policy related determinants of export survival. Moreover, information on trade duration could shed light on the macroeconomic stability of the countries as, frequent entry and exits from export markets can be a sign of trade volatility and hence macroeconomic volatility especially in countries (such as developing countries) where the trade sector dominates export activity.

Using Trinidad and Tobago for our analysis is interesting for two fundamental reasons. First, Trinidad and Tobago has actively used trade policy to promote its industrial development. This therefore allows us to look at the impact of several trade policy variables on the composition and behaviour of exports. For example, Trinidad and Tobago is a member of CARICOM, which is a free trade agreement established among twelve (12) Caribbean countries in 1973, to promote economic integration and cooperation among its members. During the period of our study, CARICOM took significant steps to strengthen the level of integration among member countries. In this context, initiatives include the reduction of the Common External Tariff (CET) and the establishment of CARICOM-bilateral trade agreements with neighbouring countries such as Venezuela, Columbia, Cuba and Dominican Republic. Also, Trinidad and Tobago has benefited from non-reciprocal preferences in the North American and

European Country markets and; over our study period, there were some market expansion due to European Enlargement. Also, Trinidad and Tobago has been a longstanding member of WTO. In view of the forgoing, conducting our analysis for Trinidad and Tobago enables us to examine the impact of a wide range of trade policy variables on both the composition and the behaviour of exports.

Second, Trinidad and Tobago is a small open hydrocarbon based economy and in economies of this nature, tremendous possibilities exist for the occurrence of the Dutch disease or the natural resource curse where gas and oil exports influence the exchange rate to the detriment of the manufacturing sector (Hosein, 2010). Notably, for most of our study period (1996-2009), there was a significant spike in oil prices where the value of exports grew at a phenomenal rate and many analysts have referred to this period as a "mini oil boom". This boom ended late in 2007 with the advent of the global financial crisis. Thus, looking at the composition and behaviour of export in the context of Trinidad and Tobago, for the period 1996-2009, is quite interesting because it allows us to capture the effect of both boom and economic downturn in the context of a hydrocarbon abundant economy. We are thus able to provide new information on the impact of economic boom and economic downturn on composition and behaviour of exports.

1.3 Organization and Main Findings of the Thesis

This dissertation brings together three (3) empirical essays on the composition and behaviour of exports in a developing country context. Following this introductory chapter, the first essay (chapter 2) looks at the extent and determinants of bilateral export specialization with an emphasis on the role of export destination characteristics. Measuring the level of specialization with the Herfindahl index, we specify two econometric models where we seek to explain export specialization with a host of policy-induced and natural export destination characteristics. We use HS 4-digit export data for Trinidad and Tobago to over 170 export destinations, for the period 1996-2009. In view of the nature of our dataset, we focus on bilateral export specialization (level of export specialization in specific export destinations) rather than overall export specialization (level of specialization across several markets) because this allows us the necessary degrees of freedom to enable meaningful econometric estimations. Further, in view of the bounded nature of our dependent variable, we estimate our econometric models mainly using Fractional Logit Generalized Linear Models (GLM).

The results of the first essay suggest that Trinidad and Tobago's exports are highly specialized. It also suggests that Trinidad and Tobago's exports are less specialized the higher the level of economic development and size of export destinations, the smaller the distance between Trinidad and Tobago and export destinations and the better the institutional quality in export markets. In addition, regional integration with CARICOM trading partners reduces export specialization, while non-reciprocal preferences from countries in North America and Europe encourage specialization. Also, higher average tariffs in export destinations increases export specialization. The results of the first essay contribute to the international trade literature in several ways. Firstly, we extend the geographical coverage of the literature on export specialization by looking at the phenomenon in the context of a small developing country. Secondly, we show that export destination characteristics (demand-side factors) do influence the pattern of bilateral export specialization. Our work therefore complements several existing studies that focus on the role of exporter characteristics (supply-side factors) in explaining export specialization. Thirdly, we provide fresh evidence on the impact of preferences, tariffs and institutional quality in export destinations on export specialization.

The second essay (chapter 3) focuses on decomposing export growth into the intensive and extensive margins; and more importantly, to examine the role of export destination attributes in explaining the intensive and extensive margin. We perform decompositions of export growth across all export destinations as well as for export destinations classified according to the World Bank's income classification using data at different levels of disaggregation, for different types of products and for different time horizons. HS 6-digit export data for Trinidad and Tobago are used for manufactured and non-manufactured goods, and HS 8-digit export data for Trinidad and Tobago for manufactured goods. All our datasets cover the period 1996-2009. To explain the determinants of trade margins, we specify an empirical model in the gravity tradition, augmented with a host of trade policy and institutional variables. We estimate our model using Ordinary Least Squares (OLS) and Poisson Pseudo-Maximum Likelihood Estimation (PPML). We perform all our estimations using HS 6-digit manufacturing export data for Trinidad and Tobago for the period 1996-2009.

The results of the second essay suggest that for manufactured goods, both in periods of economic boom and economic downturn, the extensive margin contributes more significantly to changes in export that the intensive margin. By contrast, for non-manufactued goods, the intensive margin dominates changes in export both in periods of economic boom and economic downturn. We find robust evidence that greater economic size of export destinations increases both margins of trade, but greater distance of export markets dampens the trade margins. In addition, we find strong evidence the regional integration with trading partners through CARICOM preferences increases both the intensive and extensive margins, and we find weaker evidence that non-reciprocal preferences offered by countries in North America and Europe increase the extensive margin and dampen the intensive margin. Relatedly, we find some evidence that higher average tariffs in export destinations reduces the extensive margin. By contrast, with regard to the intensive margin, average tariffs in the destination market seem not to matter. Further, we find some evidence that both trade margins are increased for exports to destinations that are WTO members. Also, we find evidence that trade promotion through Diplomatic Missions in export markets dampens the extensive margin and increases the intensive margin. Finally, we find some evidence that better institutional quality and governance in export markets dampens the intensive margin but the effect on the extensive margin seems less robust. The results of the second essay contribute to several strands of the international trade literature. For example, we provide fresh evidence on the quantitative contribution of the intensive and extensive margins to export growth in a small developing country context. More importantly, we provide fresh empirical evidence on the impact of WTO membership, tariffs and preferences (trade costs reductions) as well as economic diplomacy on the margins of trade to complement empirical studies addressing these issues.

The second essay is related to the first in that information on trade margins sheds light on the export specialization patterns and economic vulnerability of countries. Indeed, export growth predominantly at the intensive margin indicates that a country is becoming increasingly specialized in a few products (thus increasing its economic vulnerability), and export growth at the extensive margin indicates that the country is exporting new products and/or exporting to new markets and it is increasing its diversification (thus reducing its economic vulnerability). Thus, the second essay is clearly related to the first. However, the second essay accords us the opportunity to better capture the market dimension of export diversification that we are unable to capture in the first. To illustrate, in the second essay, we define the extensive margin to capture the export of already traded products to new markets, the export of new products to existing markets and the export of new products to new markets. By defining the extensive margin in this way, we are therefore able to capture the geographic dimensions of export diversification (Amurgo-Pacheco and Pierola, 2007). The second essay therefore gives us added information on the geographic dimensions of export diversification that is not captured in the first essay. Also, in the second essay, we use more disaggregated data allowing us to better capture export diversification. Notably, more disaggregated data enables us to better identify new varieties and dynamics at the product level.

The third essay (chapter 4) deals with the extent and the determinants of export duration. To measure the extent of export duration, we derive nonparametric Kaplan-Meier survival estimates. And, to examine the factors influencing export duration, we specified a Stratified Cox model, and estimate the model using the Stratified Cox estimation. We conduct all aspect of our duration analysis using HS 6-digit manufacturing export data for Trinidad and Tobago for the period 1996-2009.

The results of the third essay suggest that Trinidad and Tobago's export duration is extremely short. We find strong support for size (larger *GDP)* in export destinations increasing export duration and greater distance from markets reducing export duration. Also, we find significant evidence that the duration of trade relationships with larger initial values at the start of spells lasts longer thereby confirming the predictions of Rauch and Watson (2003). Further, we unearth substantial evidence that regional integration with and WTO membership of trading partners increases export duration. Relatedly, we discover strong evidence that trade duration is longer in export markets with higher tariffs. In addition, we find robust evidence that trade promotion as measured by the spending per capita by Trinidad and Tobago's government on Diplomatic Missions and Consulates in export destinations, stimulates longer export duration. Finally, we discoved that improved institutional quality and governance in export markets, reduces export duration. The results of the third essay contribute to several strands of the international trade literature. For example, we provide fresh evidence on how export promotion affects the duration of trade. In addition, we provided new evidence on how WTO membership influences trade duration. Also, our study addresses the paucity of literature looking at the factors affecting export duration in the context of a small industrialising economy.

The third essay is relates to the second, in that, they both address the issue of how exports growth. Whereas in the second essay we stress the importance on expansion along the intensive and extensive margin to export growth, in the third essay, we stress the vital role of export survival (sustainability margin) in export growth. A key argument (in the third essay) is that export growth could be enhanced not only by expansion along the intensive margin (exporting more of existing products) and the extensive margin (exporting more new products), but also by having fewer failures of exports (sustainability margin). Following the third essay, we conclude the thesis in chapter 5. We do this by reflecting on the main findings of the thesis, the implications of our findings for policy formulation and the directions for future research.

Chapter 2
The Determinants of Export Specialization: Evidence from a Small Industralising Economy

2.1 Introduction

One of the most common place and fundamental economic policy objectives of many developing countries is the need to diversify their export base thereby reducing export specialization (Volpe-Martincus and Gomez, 2009). Building on seminal work by Prebish (1950) and Singer (1950), several authors highlight the dangers export specialization poses to economic growth and development.[1] For example, some authors argue that export specialization increases the vulnerability of countries to external events such as terms of trade shocks and price instability which have adverse macroeconomic consequences for growth, employment, foreign exchange earnings, inflation and capital flight (Naude and Rossouw, 2008; Samen, 2010). Authors also argue that export specialization increases the susceptibility of countries to the natural resource curse (Dutch Disease) that tends to affect societies where economic activity is based on natural resource exploitation. They argue that countries which depend on the export of natural resources tend to grow more slowly than countries with a more diversified non-resource based export structure (Arezki and Van der Ploeg, 2007; Naude and Rossouw, 2008). Further, some authors advance the argument that export specialization increases the exposure of countries to investment risk and uncertainty that could be avoided if investments were spread over a wider portfolio (Naude and Rossouw, 2008; Chang, 1991). Finally, authors also argue that specialization hinders economic growth and development (Plumer and Graff, 2001; Naude and Rossouw, 2008; Dennis and

[1] Prebish (1950) and Singer (1950) argue that developing country's dependence on primary commodity production and exports leaves them vulnerable to commodity shocks, price fluctuations and declining terms of trade, especially since the income elasticity of demand of primary export commodities is low. This in turn results in fluctuations and uncertainty in their foreign reserves.

Shepherd, 2010). What seems clear from the forgoing is that excess specialization can be undesirable and may impact negatively on the developmental prospect of countries.

We recognize that the export specialization patterns of countries matter for development. We also recognize that the export specialization patterns of countries and the composition of trade is dynamic, in that, it changes over time and it varies with the type of trade partner. Notwithstanding the fact that some empirical studies look at the issue of what drives export specialization, the vast majority of studies looking at developing countries tend to focus on countries in Sub-Saharan Africa and South America. Notably, policy conclusions derived from these studies may not be appropriate for smaller developing countries. Also, many of the existing studies focus on the role of exporter characteristics (supply side factors) in influencing export specialization. An area that is unexplored is the role of export destination characteristics (demand side factors) in shaping export specialization patterns. We therefore seek to contribute to the existing literature by using export destination characteristics to explain export specialization. Moreover, although some existing studies have looked at the role of reciprocal preferences in explaining export specialization patterns, the role of non-reciprocal preferences has been largely ignored in the empirical literature. In addition, the results of single country studies looking at the effect of reciprocal preferences on export specialization have been mixed. Finally, the existing literature has largely ignored the role of tariffs and the quality of institutions and governance in export destinations in explaining export specialization.

In view of the various shortcomings of the existing literature exploring the drivers of export specialization, and given the importance of export specialization to economic development, we look at the issue in the context of a small developing country. We use data for Trinidad and Tobago for the period 1996-2009 to examine what factors drive its bilateral specialization patterns. Trinidad and Tobago is interesting because the country has actively used trade policy to promote industrial development. Moreover, as a member of CARICOM, Trinidad and Tobago has both participated in, and benefited from, several initiatives to strengthen regional integration and thereby diversify exports. Further, for most of our study period, the country experienced phenomenal export growth which ended with the advent of the global financial crisis in 2008. Our dataset consist of HS 4-digit exports to over 175 export destinations, allowing us to fully exploit variations of export specialization patterns both across time and over export destination. In this regard, our primary objectives in this chapter are to measure Trinidad and Tobago's bilateral export specialization patterns, and more importantly, to determine what factors (policy induced and natural) influence these specialization patterns.[2]

Examining export specialization in the context of a developing country is important for two fundamental reasons. The first reason relates to the the underlying export structure which typically characterizes developing countries. In this context, many developing countries have highly concentrated exports and this is associated with increased vulnerability to the vagaries of the international economic environment. The consequence of concentrated exports is that their terms of trade are heavily influenced by price developments of a limited range of products. Moreover, terms of trade volatility is one of the main determinants of income volatility which is likely to be unhealthy for economic growth and development. Further, concentrated exports in developing countries increase the risk of exchange rate instability and increase the likelihood of debt and other macroeconomic problems. The second reason for our interest in export specialization in developing countries relates to its importance in terms of trade policy formulation. Understanding the extent of bilateral export specialization and what drives it could provide extremely valuable insights for the design of trade

[2] We define export specialization in terms of the range of products exported to specific export markets (Parteka, 2007; Ali et al., 1991). In this context, a high degree of specialization (low diversification) implies a country's exports to selected markets are concentrated in a few products or sectors, whereas a low degree of specialization (high diversification) implies a country's exports to selected markets are spread across a broad range of products.

policy and export promotion initiatives. Indeed, knowledge of bilateral specialization patterns could help policy makers better understand the factors amenable to public policy interventions that could be manipulated to diversify exports in specific destination types, thereby providing important insights into export promotion in particular markets. Moreover, information on the bilateral export specialization patterns could assist policy makers to identify areas of untapped export potential which could then be targeted as part of the export promotion strategy of the country. It can also assist policy makers to identify factors which increase specialization (obstacles to export diversification) to allow appropriate policy responses to be crafted. In addition, information on export specialization pattern serves as an indicator of economic risk and vulnerability, in that, a high degree of specialization indicates the particular country is highly vulnerable to the vagaries of the international market. Notably, notwithstanding their participation in multilateral trade arrangements which restrict their autonomy in trade policy formulation, many countries find it necessary and beneficial to engage in bilateral trade arrangements, knowledge of the level of specialization in different types of export markets and information on which factors drive export specialization patterns could prove valuable in shaping the bilateral arrangements between countries.[3]

The remainder of this chapter is organized as follows. Section 2 highlights some stylized facts on Trinidad and Tobago's export specialization patterns. Section 3 reviews and evaluates the theoretical and empirical literature on the determinants of export specialization. Section 4 discusses and justifies the empirical model specification. Section 5 discusses the data description, the data sources, and the sample characteristics. Section 6 explains the estimation strategy and issues. Section 7 presents the main results and performs several robustness checks. The main conclusions of the chapter are given in section 8.

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[3] For example, despite Trinidad and Tobago's membership in CARICOM, the country has found it necessary to negotiate and finalize partial scope arrangements with a number of countries such as Panama and Guatemala. Partial scope agreements allow for tariff free exports to specific markets of selected products.

2.2 Stylized Facts on Trinidad and Tobago's Export Specialization

2.2.1 Introduction

In this chapter, export specialization is defined as the reduction in the range of products exported to specific export destinations (Parteka, 2007; Ali et al., 1991). It relates to the composition (mix) of a country's export and captures whether the country's exports to a specific destination are concentrated in a few products or whether it is scattered across many products. In this context, a high degree of export specialization (low diversification) implies a country's exports to selected markets are concentrated in a few products or sectors, whereas a low degree of specialization (high diversification) implies a given country's exports are spread across a broad range of products. Specialization and diversification are therefore two sides of the same coin, in that; increased specialization implies reduction in diversification and *vice versa*. Various indices are available in the literature to measure export specialization. These include: the Balassa index, the Herfindahl index, the Hirschman index, the Ogive index, the Entropy index and the Export Similarity index.[4] The main measure we use in this study (and one of the most popular measures) is the Herfindahl index, an index originally used to explore market structure of monopoly or perfect competition and more recently to capture the concentration or diversification of trade structure.[5] The index is calculated as follows:

$$ExSPEC_{jt} = \sum_i \left(\frac{X_{ijt}}{\sum_j X_{ijt}} \right)^2 \qquad \textbf{2.1}$$

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[4] See Hammouda et al. (2006), Parteka (2007) and Samen (2010) for discussion on the various export specialization measures.

[5] Later to test the robustness of our empirical results we use an alternative count measure. One fundamental advantage of the Herfindahl index over the count measure is that it gives more weight to products with a higher value.

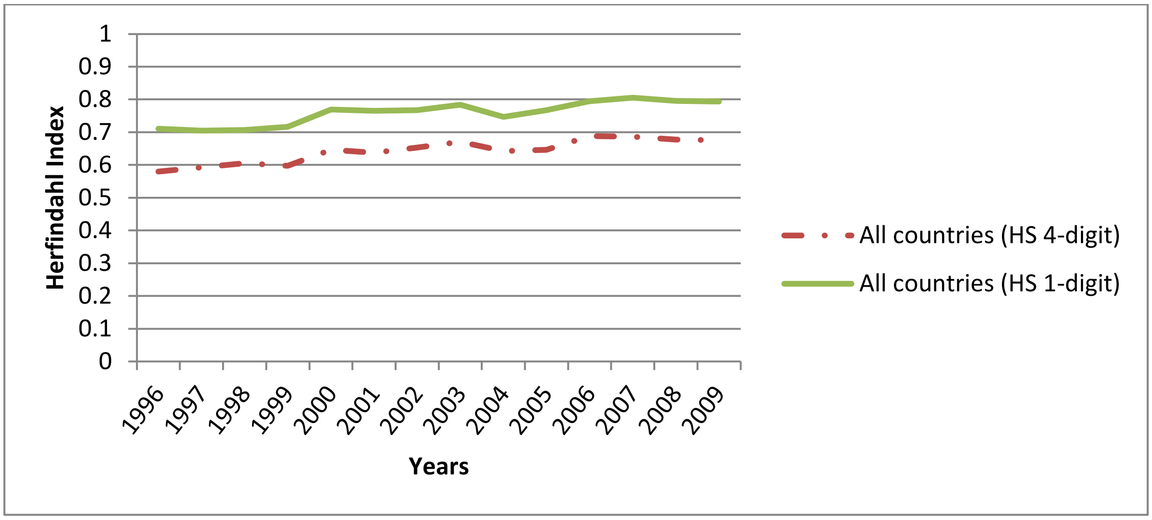
In the above specification, i represents export products, j represents export destination, t represents time and X represents export value. An index value approaching one indicates a high degree of export specialization (or concentration), whereas a value approaching zero signifies a high degree of export diversification. At the extreme, the index is equal to one if only one product is exported to a particular market in a given year.

We calculate Herfindahl indices for Trinidad and Tobago with respect to several types of export destination countries over various years, and in what follows we present and discuss the results. We calculate the Herfindahl indices using HS 4-digit export data for Trinidad and Tobago, our dataset covers the period 1996-2009. A list of export destinations in our dataset is presented in Table A2-1 in the Appendix.

2.2.2 Overall Herfindahl Index for Trinidad and Tobago, Full Sample

First, we examine the Herfindahl indices for Trinidad and Tobago with respect to all export markets for the period, 1996-2009. We calculate the indices using two different levels of data aggregation (HS 4-digit and HS 1-digit) and the results are presented in the figure which follows.

Figure 2.1: Overall Herfindahl index of Trinidad and Tobago, 1996-2009.



As shown in Figure 2.1 above, the level of specialization of Trinidad and Tobago's exports is high and increasing with both levels of data aggregation. At the HS 4-digit level of aggregation, over the period, the level of specialization averaged approximately 0.64. The index rose gradually from approximately 0.57 in 1996 to 0.67 in 2009. Similarly, at the 1-digit level of aggregation, the index averaged approximately 0.75 over the period. Indeed it increased gradually from approximately 0.71 in 1996 to 0.79 in 2009. It is evident that the level of specialization is sensitive to the level of aggregation of the data. The index is higher, the greater the level of data aggregation. Our general finding with respect to the high degree of specialization of Trinidad and Tobago's exports is not surprising, given that the country is a hydrocarbon dependent economy and economies of this nature tend to be affected by Dutch Disease which hampers diversification efforts. Indeed, McGuire et al. (2008) indicate that between 1981 and 2005, oil and gas contributed over 40% of GDP, 37% of government's current revenue and 67% of foreign exchange earnings. Our results seem to be in line with those of Hammouda et al. (2006) who report extremely high levels of export specialization for other developing countries in Africa. For example, they find the index of specialization for Nigeria and Angloa (both hydrocarbon rich countries) averaged over 0.80 for the period 1990-2002. Likewise, Volpe-Martincus and Gomez (2009) find the Herfindahl index of export specialization for Columbia for the period 1996-2005 averaged over 0.80.[6]

We then considered the level of specialization with respect to Trinidad and Tobago's twelve most important trading partners over the period and the results are presented in Table A2-2 in the Appendix. From the table, there are some interesting variations in export specialization across trading partners. Notably, the major trading partners of Trinidad and Tobago cover different geographic regions. In general, the average level of the index varies from 0.19 in the case of Venezuela to 0.70 in the in the case of Spain. In terms of North American countries, trade is much more diversified with respect to the USA than Canada. The index averaged 0.23 in the case of the USA, while for Canada it averaged 0.31. With respect to European countries, trade with respect to the UK is less specialized than that with Spain. The index averaged 0.42 in the case of the UK, while it averaged 0.71 for trade with Spain. Further, with respect to countries in the Caribbean region, the level of specialization is lowest with respect to trade with Guyana. In this regard, the index averaged 0.24 in the case of Guyana, 0.35 in the case of Barbados, 0.39 in the case of the Dominican Republic and 0.47 with respect to both Jamaica and Suriname. As it pertains to countries in South and Central America, the highest level of specialization is recorded with respect to trade with Argentina, while the lowest level is recorded with respect to trade with Venezuela. The average level of specialization in the case of Argentina is 0.68, while that for Mexico is 0.34 and Venezuela is 0.19. What is clear is that the index varies widely across trading partners. Further, when one examines the behaviour of the index across time for individual countries, huge variations are also evident. To illustrate, in terms of the USA, the index rose from 0.23 in 1996 to 0.37 in 2009. Also, with regard to the UK, the index rose from 0.33 in 1996 to 0.77 in 2009.

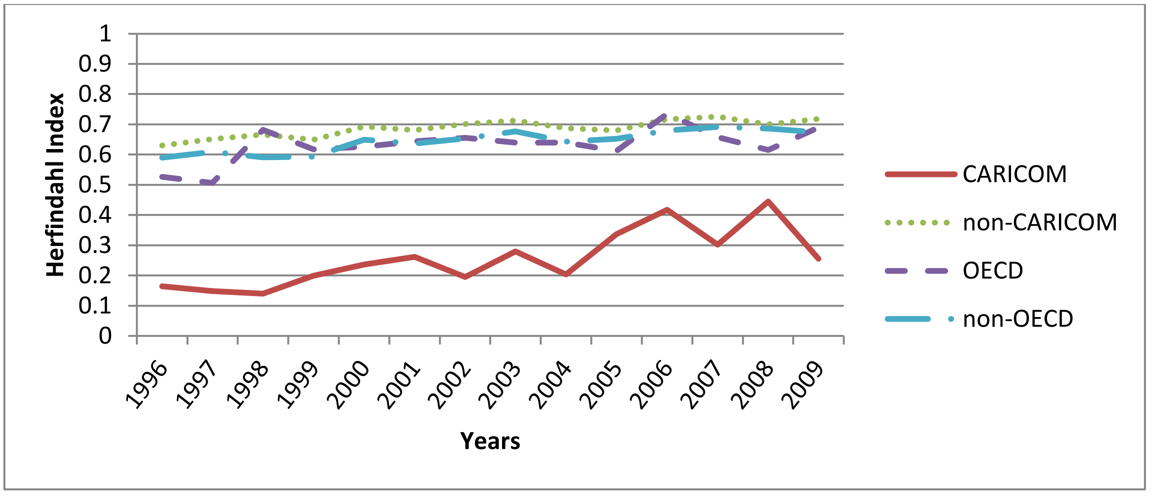
[6] Our results also seem to be in line with those of Berthelon (2011) who finds Chilean exports highly specialized over the period 1990-2007.

Similarly, in terms of the Jamaican market, the index rose from 0.42 in 1996 to 0.51 in 2009. Conversely, in the case of the Venezuelan market, the index fell from 0.20 in 1996 to 0.09 in 2009. Thus, what is also clear is that even with the same trading partner, the index is highly variable over time.

2.2.3 Overall Herfindahl Index for Trinidad and Tobago by Country Groups, Full Sample

We then considered the level of export specialization with respect to CARICOM and non-CARICOM countries; and, OECD and non-OECD countries. The results are presented in the figure below.

Figure 2.2: Overall Herfindahl index of Trinidad and Tobago with respect to CARICOM, non-CARICOM, OECD and non-OECD Countries, 1996-2009.



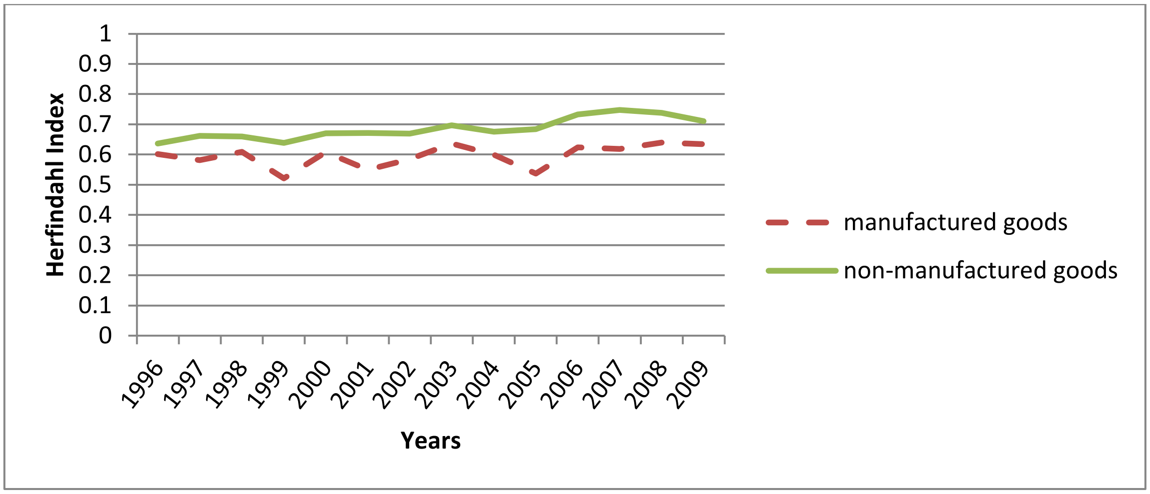
As shown from Figure 2.2 above, the level of export specialization is also highly variable across groups of countries. With respect to CARICOM and non-CARICOM countries, the level of specialization is much lower for CARICOM than for non-CARICOM countries at all times. Indeed, the level of export specialization among

CARICOM countries averaged approximately 0.25, while that for non-CARICOM countries averaged approximately 0.68. The level of export specialization with respect to CARICOM countries increased from about 0.16 in 1996 to about 0.25 in 2009. Comparatively, with respect to non-CARICOM countries, the index increased from about 0.63 in 1996 to about 0.71 in 2009. The lower level of export specialization for CARICOM countries is not surprising and suggests that CARICOM preferences is aiding in the diversification of Trinidad and Tobago's exports. With respect to OECD and non-OECD countries, the average level of specialization seems quite similar for the both groups of countries. The index averaged approximately 0.62 for OECD countries and approximately 0.64 for non-OECD countries over the study period. For OECD countries, the index rose from about 0.52 in 1996 to about 0.68 in 2009, while for non-OECD countries the index rose from approximately 0.58 in 1996 to approximately 0.67 in 2009. What seems evident from the foregoing analysis is that there exist some variations in the Herfindahl index across groups of countries.

2.2.4 Overall Herfindahl Index for Trinidad and Tobago (Manufactured and non-Manufactured Goods)

We then considered the overall Herfindahl index of Trinidad and Tobago with respect to manufactured and non-manufactured good over the period 1996-2009 and present the results in the figure which follows.

Figure 2.3: Overall Herfindahl index for Trinidad and Tobago with respect to Manufactured and non-Manufactured goods, 1996-2009.



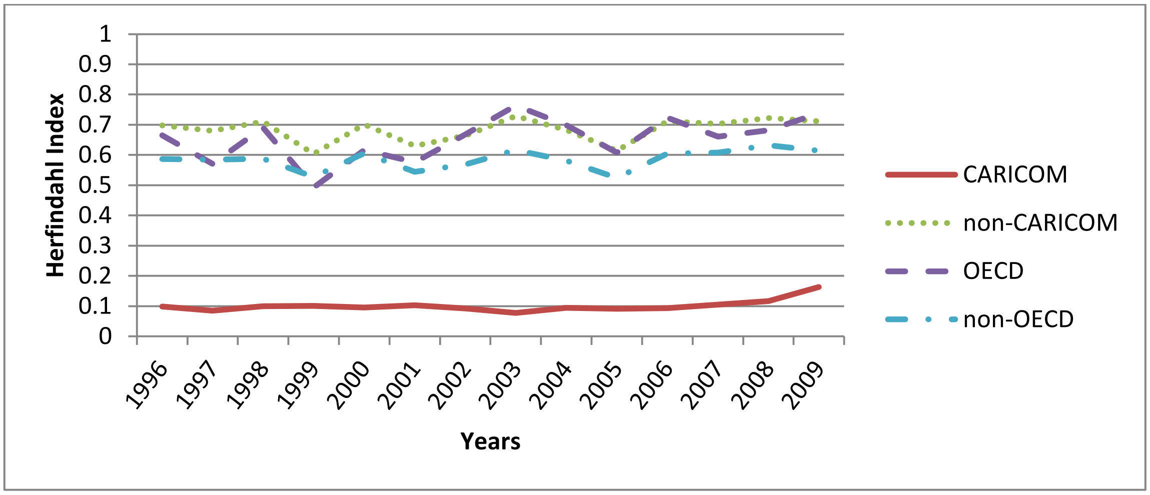
As shown in Figure 2.3 above, the Herfindahl index is lower for manufactured goods than for non-manufactured goods at all times suggesting that Trinidad and Tobago's export of manufactured goods is less specialized than it is for non-manufactured goods. This is expected given that a significant share of non-manufactured goods is made up of hydrocarbon product, and this further highlights the high dependence of the Trinidad and Tobago on the hydrocarbon sector. Over the period, the index averaged approximately 0.59 for manufactured goods and 0.68 for non-manufactured goods. The variation across time for both manufactured and non-manufactured goods is quite small. For manufactured goods, the index increased marginally from about 0.60 in 1996 to about 0.63 in 2009, while for non-manufactured goods the index increased from about 0.63 in 1996 to about 0.71 in 2009. What is clear from the above figure is that, the index varies across sectors and over time within the same sector. Also, the level of export specialization is generally high for both manufactured and non-manufactured goods. And finally, the level of specialization is generally higher for non-manufactured goods than for manufactured goods.

We then examine the Herfindahl index of manufactured goods with respect to Trinidad and Tobago's twelve major trading partners and the results are presented in Table A2-3 in the Appendix. Again, it is evident from the table that huge variations exist across trading partners. In general, the average level of the index vary from approximately 0.06 in the case of Barbados to approximately 0.77 in the in the case of Spain. In terms of North American countries, trade is much more specialized with respect to the Canada than USA. While the index averaged about 0.43 in the case of the USA, it averaged 0.67 for Canada. With respect to European countries, trade with the UK is less specialized than that with Spain. The index averaged about 0.21 in the case of the UK, while it averaged 0.77 with Spain. With respect to Caribbean countries, the level of specialization is lowest with respect to trade with Barbados. The index averaged 0.06 in the case of Barbados, 0.10 for Guyana, 0.11 for Jamaica, 0.12 for Suriname and 0.39 for the Dominican Republic. The highest level of specialization for countries in South and Central America is recorded with respect to trade with Argentina, while the lowest level is recorded with respect to trade with both Venezuela and Mexico. The average level of specialization in the case of Argentina is 0.63, while that for Venezuela and Mexico is 0.40 and 0.60, respectively. What is clear is that, in terms of manufactured goods the index is highly variable across Trinidad and Tobago's major trading partners. Moreover, when one examines the behaviour of the index for manufactured goods across time for individual countries, huge variations are also quite evident. For example, for trade with the USA, the index fell from 0.65 in 1996 to 0.09 in 2009.

2.2.5 Overall Herfindahl Index for Trinidad and Tobago by Country Groups, Manufactured Goods

We then examine the Herfindahl index for manufactured goods with respect to CARICOM and non-CARICOM markets; and, OECD and non-OECD countries and the results are presented in the figure which follows.

Figure 2.4: Herfindahl index of Trinidad and Tobago for Manufactured Goods with respect to CARICOM, non-CARICOM, OECD and non-OECD countries, 1996-2009.

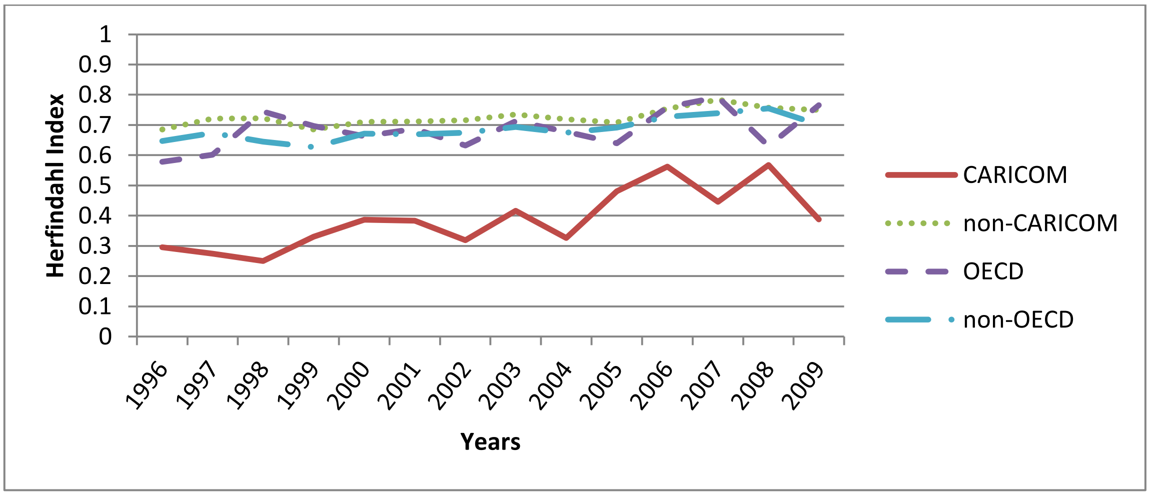


As shown in Figure 2.4 above, the level of export specialization for manufactured goods is also highly variable across groups of countries. In terms of CARICOM and non-CARICOM countries, the level of export specialization for manufactured goods is much lower for CARICOM than for non-CARICOM countries. Indeed, the level of specialization among CARICOM countries averaged approximately 0.10, while that for non-CARICOM countries averaged approximately 0.68. With respect to OECD and non-OECD countries, the index is higher for OECD than non-OECD countries. The index averaged approximately 0.65 for OECD countries and 0.58 for non-OECD countries in the period. The higher levels of export specialization with respect to trade with OECD countries is somewhat surprising, since OECD countries are high income countries where purchasing power is greater and they can import a broader range of goods. However, our results could be driven by the fact that competition is stiffer in OECD country markets, and therefore, Trinidad and Tobago firms may only be able to profitably export a limited range of products to OECD countries in comparision to what they can export to non-OECD countries.

2.2.6 Overall Herfindahl Index for Trinidad and Tobago by Country Groups, non-Manufactured Goods

We then considered the pattern of export specialization for non-manufactured goods with respect to CARICOM and non-CARICOM countries; and, OECD and non-OECD countries and the results are presented in the figure below.

Figure 2.5: Herfindahl index of Trinidad and Tobago for non-Manufactured goods with respect to CARICOM, non-CARICOM, OECD and non-OECD countries, 1996-2009.



As shown from Figure 2.5 above, the level of export specialization for non-manufactured goods is also highly variable across groups of countries. With regard to CARICOM and non-CARICOM countries, the level of specialization for non-manufactured goods is much lower for CARICOM than for non-CARICOM countries. Indeed, the level of export specialization among CARICOM countries averaged approximately 0.38, while that for non-CARICOM countries averaged approximately 0.72. With respect to OECD and non-OECD countries, the average value of the index is approximately 0.68 in both cases.

We also look at the level of export specialization of Trinidad and Tobago's non-manufactured goods with respect to its twelve most important trading partners and the results are presented in Table A2-4 in the Appendix. Again, from the table, huge variations across trading partners are noticable. In general, the average level of the index vary from 0.24 in the case of Venezuela to 0.80 in the in the case of Spain. In terms of North American countries, trade is much more specialized with respect to the Canada than USA. The index averaged 0.25 in the case of the USA while the average for Canada was 0.35. With respect to European countries, trade with respect to the UK is less specialized than that with Spain. The index averaged 0.44 in the case of the UK while it averaged 0.80 with Spain. For Caribbean countries, the level of specialization is lowest with respect to trade with Guyana. The index averaged 0.34 for Guyana, 0.47 for Barbados, 0.54 for Dominican Republic, 0.56 for Jamaica and 0.60 for Suriname. With regard to countries in South and Central America, the highest level of specialization is recorded with respect to trade with Argentina, while the lowest level is recorded with respect to trade with Venezuela. The average level of specialization in the case of Argentina is 0.69, while that for Mexico is 0.49 and Venezuela is 0.24. What is clear is that in terms of non-manufactured goods, the index also varies highly across trading partners. Further, when one examines the behavior of the index for non-manufactured goods across time for individual countries, huge variations are also quite evident. For example, for trade with the USA the index rose from 0.27 in 1996 to 0.37 in 2009, and for trade with the UK the index rose from 0.35 in 1996 to 0.79 in 2009.

2.2.7 Summary

To summarize, the foregoing analysis highlight five key issues. First, the level of export specialization of Trinidad and Tobago has been high and increasing over the period 1996-2009. Second, the index is higher the more aggregated the data which one uses. Third, the index of specialization is highly variable across export destinations (moreso than over time) suggesting that export destination characteristics do matter in explaining export specialization. Fourth, the index of specialization is lower for CARICOM countries than for non-CARICOM countries, and it is lower for manufactured goods than for non-manufactured goods. Fifth, the index of specialization is quite similar for OECD and non-OECD countries.

2.3 The Related Literature

2.3.1 Theoretical literature

The theoretical literature on the drivers of export specialization is quite sparse. Notwithstanding this, the theoretical literature explaining the determinants of export specialization can generally be classified into three broad strands of international trade models: the traditional trade theory models, new trade theory models and new economic geography theory models. Further, some theoretical insights and explanations can also be found in other theoretical models in both the macroeconomics and trade literature.

The Traditional Trade Theory Models

The traditional trade theory models emphasize the role of endowments, technology and geography in explaining export specialization patterns. These models comprise Heckscher-Ohlin models and the Ricardian trade models; and are based on the assumptions of constant returns to plant scales, homogenous products and perfectly competitive markets. They explain differences in production and export structures through differences in underlying country characteristics such as geography, endowments and technology (Shikher, 2010). More specifically, in the Heckscher-Ohlin formulation for instance, the pattern of comparative advantage is determined by country's relative factor endowments and countries specialize and export goods which use their abundant factor intensively (Ohlin, 1933; Vogiatzoglou, 2009). Thus from this perspective, there is a positive relationship between export specialization and endowments. To illustrate, from this perspective, countries that are relatively human capital abundant or research and development abundant will produce and export the goods using these factors intensively, thus there is increasing specialization in these goods (Dutt et al., 2008; Vogiatzoglou, 2009). The intuition is that countries rich in one kind of resource (or factor) are likely to concentrate their exports in the manufacture of products intensive in that resource (or factor) and have highly concentrated export structures (Harrigan and Zakrajsek, 2000; Caldeira and Viera, 2010; Parteka and Tamberi, 2008). Also from this perspective, endowment similarity influences export specialization patterns. For example, trade between any two countries that are oil and gas abundant are expected to be more specialized than if the endowment patterns were quite different. In summary, with the Heckscher-Ohlin formulation, export specialization is driven by endowment factors and increases with the level of endowment.

In the Ricardian model, the pattern of comparative advantage is determined by productivity differences (Ricardo, 1817; Dornbusch et al., 1977). From this model, increased technology inputs (research and development or human capital) results in increased production capabilities and improved productivities, leading to enhanced comparative advantage and thus increased export specialization. Thus from this formulation, technology-related inputs are expected to have a positive influence on export specialization (Dutt et al., 2008; Vogiatzoglou, 2009). The role of geography and trade costs is incorporated by Eaton and Kortum (2002) into a Ricardian model of trade (one based on differences in technology). From this perspective, trade costs depend on geographic distance as well as artificial barriers such as tariffs and quotas. Thus, trade costs vary across pairs of countries and affect the composition of trade. In this context, higher trade costs influenced by geography and/or other artificial barriers will increase export specialization pattern in a particular export destination (Dutt et al., 2008). Also following a similar line of argument is Shikher (2010), who argues that trade costs affect the pattern of specialization because it limits the geographical range of comparative advantage, forcing it to be determined within the neighborhood of the particular country. Implicit in this argument, the level of export specialization is positively related to geographic distance (and therefore trade costs). In summary, with the Ricardian formulation, export specialization is driven by factors as the state of technology, geography and trade costs.

The New Trade Theory Models

In these models, demand characteristics and market structure play a key role in explaining export specialization patterns. The new trade theory emerged due to various short comings of the traditional trade theory models. These models are based on the assumptions of increasing returns to scales, differentiated products and imperfectly competitive markets. They were originally designed to address the high incidence of trade between countries that have similar technologies and factor endowments, an empirical fact that was in stark contrast with the traditional Ricardian and Hecksher-Ohlin predictions that the bulk of trade would be between dissimilar countries. Krugman (1979) presents the workhorse model of trade with a monopolistic structure. In his model, the number of varieties produced in a country is proportional to the size of the economy. It is argued that market size directly affects the degree of product differentiation and consequently, larger countries which have more heterogeneous structures of economic resources and benefit from economies of scale can produce a wider range of products and as such they have less specialized export patterns. Thus in this model, country size of the exporting country negatively affects its export specialization pattern. Also, in these models, size differences also influence the pattern of specialization. To illustrate, Krugman (1981) argues that trade increases with size similarity of the economies and is greatest when two countries are of equal size. Thus implicit in this model, trade is more specialized the greater the size differences between two economies (Helpman and Krugman, 1985; Parteka and Tamberi, 2008).

Although the new trade theory models focus on the characteristics (country size) of the exporting countries, there also exists a literature that speaks to the role of country size of the export destination in explaining export specialization patterns. To illustrate, Brada and Mendez (1983) argue that larger countries are more self-sufficient and less reliant on international trade implying that exports to larger countries are more specialized. A contrary view is held by Amurgo-Pacheco and Pierola (2007) who argue that larger countries have larger markets thus increasing the probability of finding demand for new products, thus a larger range of products is exported to larger markets and trade is less specialized. These arguments imply that the relationship between export specialization and the size of the export destinations is ambiguous, (Parteka and Tamberi, 2008; Taylor, 2007).

The New Economic Geography Models

The next strand of the literature, the new economic geography models, stress the importance of the degree of international access in explaining export specialization (Venables and Limao, 2002; Vogiatzoglou, 2009). Originating from the new trade theory, with this perspective, transport costs and geographical characteristics are the key factors explaining export specialization patterns. It is argued that the geo-political position of a given country affects its ability to export intensively a large variety of products. Characteristics such as distance from markets, climate zone or the accessibility of water transport influence trade costs and may affect the ability to operate intensively in international markets (Frankel and Romer, 1999; Parteka and Tamberi, 2008). From this perspective, countries that are closer in terms of distance and have greater access to sea transport, have a wider range of goods in which comparative advantage exists and exports are less specialized (more diversified). Thus with this perspective, export specialization is mainly influenced by geography characteristics.

Related to geography is the issue of trade costs which influence export specialization patterns. Shikher (2010) identifies two ways in which trade cost affects trade specialization. First of all, trade cost affects the relative cost of goods from exporter countries in importer countries and therefore the comparative advantage. Secondly, the existence of trade costs means, the pattern of trade is determined by comparative advantage relative to the low-trade-cost ("neighbouring") partners and not so much the high-trade-cost ("far away") countries. In other words, trade costs decreases the geographical range of comparative advantage (also see Deardorff, 2004).

Some other Determinants of Export Specialization

Not all the potential drivers of export specialization could fit neatly into the above theoretical trade models. Indeed, there are some potential drivers of export specialization where one can draw on other branches of economic theory for their explanation. These relate to the following: quality of human capital, institutional quality and governance, trade policy, macroeconomic stability, and the level of economic development. We discuss each in turn.

Quality of Human Capital and Research and Development

The role of human capital in influencing export specialization is rooted in the literature on endogenous growth theory. Implicit in this literature, human capital has a negative effect on export specialization. For instance, Agosin et al. (2009) argue that there is a negative effect of human capital accumulation on export specialization (positive effect on diversification) if it allows countries to change their specialization patterns from commodities to manufactured goods. He argues that the greater the availability of specialized human capital and consequently the lower relative cost, allows firms to employ larger amounts of human capital in research and development, which implies a larger variety of goods will be produced, thus greater export diversification and less specialization (also see Romer, 1990; Grossman and Helpman, 1991; Parteka and Tamberi, 2008). Also closely related to the quality of human capital is research and development. As Parteka and Tamberi (2008) argue, better opportunities for research and development should promote the introduction of new goods, structural change and the diversification process. Thus, the level of export specialization is lower the greater the opportunities for research and development.

Institutional Quality and Governance

There is a recent literature that emphasizes the influence of institutional quality and governance on export specialization patterns (De Groot et al., 2003; Crabbe et al., 2009; Jansen and Nordas, 2004; Parteka and Tamberi, 2008). Indeed, institutional quality and governance influences both the opportunities for, and the cost of trade by influencing the incentives of economic actors to invest, to innovate and to organize production. It also influences trust and contract enforcement. Both from the perspective of exporters and importers the effect of institutional quality and governance can be experienced. To illustrate, from the perspective of the exporter countries, Parteka and Tamberi (2008) argue that characteristics such as the effectiveness and size of government, protection of property rights, access to money and credit, labour market and business regulation quality, freedom to trade internationally, political stability, rule of law and control of corruption directly affects the capacity of local producers to flexibly adjust their production structures to international surroundings, enhancing heterogeneous economic activity. In their view, it is expected that widely defined improvements in institutional quality and governance reduce export specialization. Moreover, improvements in institutional quality and governance in importer countries also influence the pattern of export specialization. To illustrate, De Groot et al. (2003) argue that better quality institutional framework reduces uncertainty about contract enforcement and general economic governance. They note that this reduces transactions costs directly by increasing the security of property, as well as indirectly, by increasing the level of trust in the process of economic transactions. They contend that institutional homogeneity leads to familiarity with each other's formal procedures and with the informal conventions and habits developed to deal with the governance situation. Thus, if traders in both countries experience similar levels of institutional effectiveness, they are better equipped to use each other's institutions and to operate in each other's institutional environment. This reduces adjustment costs that have to be made because of unfamiliarity with international trading partners, and lowers the insecurity related to transaction contingencies in trade. Moreover, similarity of informal business procedures may increase bilateral trust and economic agents have more confidence in being compatible trading partners in comparison to traders from two institutionally heterogeneous countries. They argue that insecurity of international transactions influence trade by imposing a price mark-up on trade goods. Thus from this perspective, widely defined, good quality of institutions and governance in export destinations are associated with less specialized exports (also see Taylor, 2007).

Trade Policy

There is also a growing literature that speaks to the effect of trade policy on export specialization patterns. The degree of openness, membership in Preferential Trade Agreements (PTA) and the level trade barriers certainly has implications for the level of export specialization. To illustrate, conventional trade theory models support a negative relationship between openness and specialization. In a world of no barriers to trade, countries would specialize according to comparative advantage and therefore have more specialized trade (Hammouda et al., 2006). However, as Parteka and Tamberi (2008) argue, trade liberalization can induce market extension and potential gains from trade may cause major product diversification (also see Krugman and Venables, 1990; Costas et al., 2008). The implication here is that trade liberalization leads to greater export diversification and less specialized trade. Similarly, Sanguinetti et al. (2004) argue that the elimination or reduction of tariffs makes imports from partner's economies become cheaper. This in turn may affect import demand and as a consequence affect the flow of trade and production in many sectors. They note that the presence of tariff preferences may foster local production and exports of products that could not have been exported under non-preferential liberalization. In addition, it can provoke the reorientation of exports that were previously headed to third markets. What this implies is that exports to partner countries relative to those geared to the rest of the world will be larger, the greater the tariff preference enjoyed. Thus, the level of tariff preferences influences the pattern of export specialization (Feenstra and Kee, 2007; Volpe-Martincus and Gomez, 2009).

Macroeconomic Stability

Macroeconomic conditions in exporter countries also influence the pattern of export specialization. As Bebezuk and Berrenttoni (2006) and Vogiatzoglou (2009) argue, the exchange rate alters relative prices and influences competitiveness and trade specialization patterns. They argue that devaluation makes it profitable for a wider set of firms to sell abroad who before the change in relative prices, could not export because they could not compete in the international market. Thus, the real exchange rate is expected to influence export specialization patterns though its influence on relative prices and competitiveness. Moreover, some authors argue that high levels of inflation damage diversification prospects and encourage specialization. They argue that a high inflation environment is not conducive to the development and maturation of new sectors (Hammouda et al., 2006).

The Level of Economic Development

A key influence on the export specialization pattern of countries is the level of development of the exporter and the importer. There is a growing literature that looks at the effect of economic development on the export specialization pattern of countries. The level of development of a country measured by per capita GDP affects the level of bilateral export specialization because it influences the productive potential of the exporter country and the purchasing power of importer country. From the standpoint of the exporter countries, there is no neat theoretical indicator on what the nature of the relationship between GDP per capita and specialization should be. Indeed, Acemoglu and Zilibotti (1997) argue that the development of diversity is low at lower levels of development because of the scarcity of capital and the indivisibility of investment projects. They argue that development goes hand in hand with diversification and more diversified structures of economic activity can go in parallel with higher levels of per capita GDP. Thus according to this perspective, there is a monotonic relationship between export diversification and the level of development (Hammouda et al., 2006; Cabral and Viega, 2010). The theoretical relationship between specialization and GDP per capita has been tested with mixed results. For instance, Imbs and Wacziarg (2003) and Koren and Tenreyo (2007) find a U-shaped relationship between the two variables. They find at low levels of income specialization reduces, and at high levels of income specialization increases. By contrast, both De Benedictis et al. (2009) and Parteka and Tamberi (2008) find an inverse relationship between the two variables. Indeed, they find there is a tendency for despecialization as GDP per capita grows.

From the standpoint of the importer counties, as Sandberg et al. (2006) argue, countries with higher GDP per capita are expected to have higher purchasing power, thus can import a broader range of goods and the export pattern is likely to be less specialized. Thus from this perspective, there is a negative relationship between the level of economic development and specialization patterns (also see Amurgo-Pacheco and Pierola, 2007; Dutt el al., 2008). However, other authors such as Bebczuk and Berretoni (2006) argue that importer countries with a greater level of economic development tend to have relatively diversified production bases and therefore are more self-sufficient and trade less. Thus in their view, the level of export specialization increases with level of economic development. In view of the foregoing discussion, from the perspective of the importer countries, the relationship between the level of economic development and export specialization patterns is ambiguous.

2.3.2 Empirical Literature

The Coverage

There are only few empirical studies exploring the factors which explain export specialization. A list of the key studies on the drivers of export specialization is shown in the table which follows.

Table 2.1: Coverage of the Empirical Literature on the Determinants of Export Specialization.

No	Study	Country	Year(s)	Specialization Index and Data Aggregation	Trade Flow	Product Groups
1	Sanguinetti et al.(2004)	Argentina	1992-2000	Export share, HS 6-digit	Bilateral	All Goods
2	Hammouda et al. (2006)	18 African Countries	1996-2001	Hirschman index, 3-digit SITC	Multilateral	All Goods
3	Bebczuk and Berrettoni (2006)	56 Mix	1962-2002	Herfindahl index, 2-digit	Multilateral	All Goods
4	Habiyaremye and Ziesemer (2006)	46 Countries in Sub-Saharan Africa	2002	Herfindahl index, 3-digit SITC	Multilateral	All Goods
5	De La Crruz (2008)	21 Countries in Central America and the Caribbean	1983-1999	Herfindahl index 6-digit, HTS	Multilateral	All Goods excluding Crude
6	Parteka and Tamberi (2008)	60 Mix	1984-2004	Relative Gini index SITC, 3-digit	Multilateral	Manufactured Goods
7	Dutt et al. (2008)	143 Mix	1962-1999	Herfindahl index 4-digit, SITC	Multilateral	All Goods
8	Vogiatzoglou (2009)	29 major exporters of ICT	2000-2006	Balassa index, 3-digit, SITC	Multilateral	ICT Products
9	Agosin et al. (2009)	161 Mix	1962-2000	Herfindahl index, 3-digit SITC	Multilateral	All Goods
10	Volpe-Martincus and Gomez (2009)	Columbia exports to the United States	1996-2005	Count, HS 10-digit	Bilateral	All Goods
11	Crabbe and Beine (2009)	13 Central and Eastern European Countries	1989-2000	Herfindahl index, HS 8-digit.	Multilateral	All Goods
12	Cabral and Veiga (2010)	48 Countries in Sub-Saharian Africa	1960-2005	Herfindahl index, 5-digit SITC	Multilateral	All Goods
13	Kim and Kim (2012)	Chile	1990-2009	Herfindahl index, 5-digit SITC	Bilateral	All Goods

Notes: Single country studies look at export specialization on a bilateral basis.

As shown in Table 2.1 above, most of the econometric studies on the drivers of export specialization are of fairly recent vintage. It is also evident that studies look at a range of countries (developed and developing), but it seems evident that most of the developing country studies focus on countries in Sub-Saharan Africa and South America. Studies are conducted over both long time periods (such as Bebczuk and Berrettoni, 2006; Parteka and Tamberi, 2008; Dutt el al., 2008) and short time periods (such as Sanguinetti et al., 2004; Hammouda et al., 2006; Volpe-Martincus and Gomez, 2009). In terms of the index they use to measure export specialization, most studies use the Herfindahl index. In this regard, exceptions include Parteka and Tamberi (2008) which use a Relative Gini index, Vogiatzoglou (2009) which uses the Balassa index and Volpe-Martincus and Gomez (2009) that use a simple count measure. Notably, studies calculate export specialization with varying degrees of data aggregation. For example, with respect to the Herfindahl index the level of data aggregation ranges from the 2-digit (in the case of Bebczuk and Berrettoni, 2006) to the 8-digit (in the case of Crabbe and Beine, 2009). Further, although the majority of studies are conducted on a multilateral basis, some studies (for example Sanguinetti et al., 2004; Volpe-Martincus and Gomes, 2009; Kim and Kim, 2012) are conducted using a single country. Moreover, although most of the studies look at all goods, there were some notable exceptions. For instance, Parteka and Tamberi (2008) look exclusively at manufactured goods and Vogiatzoglou (2009) looks specifically at Information Communications Technology (ICT) product.

Previous Empirical Specifications and Preferred Estimation Techniques

In terms of the specification, there exist a tremendous degree of heterogeneity with regard to the explanatory variables the various studies employ to model export specialization and the estimation techniques they use. The specifications and preferred estimation techniques are presented in the table below.

Table 2.2: Specifications and Estimation Technique of previous Studies on the Determinants of Export Specialization.

Study No. (as in Table 2.1)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**Expected Sign**
Independent Variables														
Per Capita GDP (i)		X	X						X			X	X	±
GDP (i)					X	X								±
GDP(j)													X	±
Population (i)				X		X	X					X		±
Distance (ij)						X			X				X	+
Remoteness (ij)							X							+
Landlocked (i)												X		+
Language (ij)													X	-
Border (ij)													X	-
Spatial Correlation (ij)						X								±
Technology and Human Capital (i)				X				X	X			X		-
Endowment of Natural Resources (i)												X		+
Research and Development (i)						X		X						-
Home Market Size (i)	X							X						+
Agglomeration Economies (i)								X						+
Infrastructural Quality (i)				X				X						+
Multinational Firm Activity (i)								X						+
Manufacturing Exports to Total Exports (i)			X											-
Fuel Exports to Total Exports (i)			X	X										+
Gross Fixed Capital to GDP (i)		X	X											±
Credit to Private Sector to GDP(i)			X											±
Telephone Lines (per 1000 people) (i)			X											±
Net Foreign Direct Investment to GDP(i)			X											±
Terms of Trade Variations (i)									X					-
Capital Investment (i)				X										-
Lag Export Specialization (i)											X			-
Institutional Quality (i)		X				X			X		X	X		-
Real Exchange Rate (i)		X			X			X						-
Exchange Rate Volatility (i)									X					+
Openness (X+M)/GDP (i)		X	X		X	X		X	X					±
GATT/WTO (i)							X							-
Preferential Trade Agreements (PTA) (ij)	X				X	X	X			X		-	X	-
GSP Preferences (ij)					X		X							-
Average Tariff (j)	X									X	X			±

continued

Table 2.2 continued

Study No. (as in Table 2.1)	1	2	3	4	5	6	7	8	9	10	11	12	13	Expected Sign
Preferred Estimation Techniques														
Generalized Method of Moments (GMM) System Estimator									X					
GLS		X												
Fixed Effect IV Framework												X		
Panel Two-Stage FGLS					X									
OLS	X			X		X	X				X		X	
Fixed Effects Panel			X					X						
Random Effect Poisson										X				

Note: i and j represent exporter and importer countries, respectively.

As shown in Table 2.2 above, studies use a wide range of explanatory variables to explain export specialization. In general, it seems evident that studies control for the level of economic development, country size, geographic characteristics, state of technology and human capital, endowment, trade policy, institutional quality and macroeconomic conditions. Indeed, studies look at the determinants of export specialization using both exporter country characteristics (primarily) and importer country characteristics. In terms of the level of economic development, five studies (2, 3, 9, 12 and 13) include the per capita GDP of exporter countries. In terms of economic size variables, studies use the GDP of exporter countries (5 and 6), the GDP of importer countries (study 13) and the population size of exporter countries (4, 6, 7 and 12). In terms of geographic characteristics variables, three studies (6, 9 and 13) control for the distance from export markets. Other geographic variables a few studies use include remoteness, landlocked, language and border. As it pertains to the state of technology and human capital, some studies control for technology and human capital in exporter countries (4, 8, 9 and 12) and the state of research and development in exporter countries (6 and 8). In terms of endowment, some studies control for the share of fuel exports in total exports of exporter countries (3 and 4) and natural resource endowment in exporter countries (study 12). With regard to institutional quality, several studies (2, 6, 9, 11 and 12) control for the state of institutional quality in exporter countries. In terms of macroeconomic variables, studies control for the real exchange rate of the exporter countries (2, 5 and 8) and Gross Fixed Capital to GDP of export countries (2 and 3). Finally, as it pertains to trade policy, studies use a wide range of variables. For example, studies use the level of openness of exporter countries (2, 3, 5, 6, 8 and 9), the presence of Preferential Trade Agreement (PTA) between exporters and importers (1, 5, 6, 7, 10 and 13), and the average tariff of export destinations (1, 10 and 11). What seems evident from the foregoing analysis is that studies use a wide range of explanatory variables to explain export specialization. Moreover, turning our attention to the preferred estimation techniques, studies employ a variety of estimation methods but the most popular technique is OLS. Indeed, this is the technique of choice in several studies (1, 4, 6, 7, 11 and 13).

Previous Empirical Findings

The results of empirical testing on the drivers of export specialization are shown in the table which follows.

Table 2.3: Results of Empirical Testing on the Determinants of Export Specialization

Study No. (as in Table 2.1)	1	2	3	4	5	6	7	8	9	10	11	12	13	Expected Sign
Independent Variables														
Per Capita GDP (i)		-***	+***						-**			-***	-***	±
GDP (i)					-nr	-***								±
GDP (j)													-***	±
Population (i)				-***		-***	-***					-***		±
Distance (ij)						+***			+ ns				+***	+
Remoteness (ij)							+***							+
Landlocked (i)												+***		+
Language (ij)													-***	-
Border (ij)													-***	-
Spatial Correlation (ij)						-ns								±
Technology and Human Capital (i)				-***				+*	-**			-***		-
Endowment of Natural Resources (i)												+***		+
Research and Development(i)						+ns		+***						-
Home Market Size(i)	+***							+ns						+
Agglomeration Economies (i)								+***						+
Infrastructural Quality (i)				-**				+***						+
Multinational Firm Activity (i)								-ns						+
Manufacturing Exports to Total Exports (i)			-***											-
Fuel Exports to Total Exports (i)			+***	+***										+
Gross Fixed Capital to GDP (i)		-***	+***											±
Credit to Private Sector to GDP (i)			+ns											±

continued

Table 2.3 continued

Study No. (as in Table 2.1)	1	2	3	4	5	6	7	8	9	10	11	12	13	Expected Sign
Telephone Lines (per 1000 people) (i)			+**											±
Net Foreign Direct Investment to GDP (i)			-ns											±
Terms of Trade Variations (i)									+ns					-
Capital Investment (i)				-ns										-
Lag Export Specialization (i)											-***			
Institutional Quality (i)		-***				-**			-**		+***	-***		-
Real Exchange Rate (i)		+***			+nr			-ns						-
Exchange Rate Volatility (i)									+**					+
Openness (X+M)/GDP (i)		+***	+***		-nr	+ns		+***	+**					±
GATT/WTO (i)							-***							-
Preferential Trade Agreements (PTA) (ij)	-***				-nr	-ns	-***			-***			+***	-
GSP Preferences (ij)					+nr		+***							-
Average Tariff (j)	-*									+**	-***			±

Note: i and j represent exporter and importer countries, respectively. Also, ***indicates significance at 1%, ** indicates significance at 5% and * indicates significance at 10%. In addition, nr means the level of significance is not reported and ns means the coefficient is not significant.

As shown in Table 2.3 above, empirical studies generally display a fair degree of heterogeneity in terms of their findings. Most of the studies including GDP per capita of exporter countries report negative and significant relationships with export specialization (2, 9, 12 and 13) suggesting, that the greater the level of economic development of exporter countries the more diversified (less specialized) are its exports. An exception in this regard is study 3 which reports a positive and highly significant relationship. Similarly, most of the studies controlling for country size of exporter countries report negative and significant relationships suggesting, that larger countries have more diversified exports. For example, all studies controlling for population and GDP of exporter countries report negative and significant relationships. The sole study controlling for GDP of importer countries also reports a negative and significant relationship. Focusing on the geographic characteristics variables, all studies including distance report the expected positive and highly significant relationship with export specialization, showing that exports are more specialized to more distant trading partners. Further, in terms of the variables capturing state of technology and human capital, all studies using technology and human capital in export countries report the expected negative and significant relationship with export specialization, showing that exports from countries rich in technology and human capita are less specialized. By contrast, studies using research and development in exporter countries to capture the state of technology and human capital surprisingly report positive relationships with export specialization. As it relates to endowment variables, all the studies including the share fuel exports to total exports and endowment of natural resources in the exporter countries report the expected positive relationship with export specialization. This indicates that endowment of natural resources increases specialization. Focusing on the institutional quality variable, most studies which include this variable report the expected negative and significant relationship with export specialization, showing that better institutional quality and governance in the exporter countries reduces export specialization. The exception in this regard is study 11 which reports a positive and significant relationship. Further, as it pertains to the macroeconomic variables, the results with respect to variables such as the real exchange rate and gross fixed capital formation to GDP in exporter counties are mixed, with negative and significant relationships in some cases and positive and significant relationships in other cases. Focusing on the trade policy variables, as it pertains to trade openness in exporter countries, most studies report positive and significant relationships with export specialization, showing that exports are more specialized from more open economies. Also, as it relates to Preferential Trade Agreements (PTA) between the exporters and importers, most studies including this variable report the expected negative and significant relationship with export specialization, in line with the argument that reciprocal trade agreements results in less specialized exports. The only exception in this regard is study 13 which reports a positive and significant relationship. Finally, of the studies controlling for the average tariff in export markets, two (study 1 and 11) report a negative and significant relationship with export specialization and one (study 10) reports a positive and significant relationship.

2.3.3 Evaluation of Literature and Research Motivation

A careful examination of the existing literature on the determinants of export specialization points to several important gaps that suggest the need for further research. First and foremost, most of the existing literature looks at export specialization on a multilateral basis and as such they look primarily at the influence of exporter characteristics in explaining export specialization. We therefore have a relatively good understanding of how exporter characteristics influence export specialization, but relatively limited evidence on how the characteristics of destinations affect export specialization. This latter issue is the central one we seek to address. We aim to show, notwithstanding the characteristics of exporter countries, that export destination characteristics do play a critical role in shaping export specialization patterns. Therefore, unlike the existing studies that are multilateral in nature and look at the issue of export specialization from the supply side, our study is bilateral in nature and seek to examine the role of demand side factors in explaining export specialization patterns. Further, although some existing studies look at the role of preferences in explaining export specialization, very few studies look at the role of non-reciprocal preferences in influencing export specialization patterns. Moreover, of the studies looking at the effect of reciprocal preferences on export specialization patterns on a bilateral basis, the results have been mixed with one study reporting a negative and highly significant relationship with export specialization and the other reporting a positive and highly significant relationship. Our work therefore seeks to provide fresh evidence not only of the role of reciprocal preferences in explaining export specialization but more specifically of the role of non-reciprocal preferences in explaining export specialization. These issues hold special importance in terms of trade policy formulation and export promotion. Indeed, Gamberoni (2007) argues that preference schemes can create incentives to specialize and may actually reduce incentives to diversify. He argues that preference schemes could contribute to locking in developing countries even more decisively into existing structures. In addition, quite surprisingly, very few studies have examined the role of tariffs in destination markets in explaining export specialization. Given that tariffs constitute an important aspect of trade policy, we are interested in the policy relevant question of what is the role of tariffs in shaping export specialization patterns. Also, the existing literature has tended to focus on institutional factors and governance in exporter countries in explaining export specialization patterns and has largely ignored the role of institutional factors and governance in export destinations in explaining export specialization patterns. We therefore seek to provide fresh evidence on the influence of institutions and governance in export destinations in explaining export specialization patterns. In addition, most of the existing empirical studies employ OLS in their estimation. However, because of the nature of the dependent variable used in these studies (Herfindahl index which range in values between 0 and 1), OLS may yield inconsistent coefficient estimates. We therefore seek to examine the determinants of export specialization using a different estimation strategy and report OLS for comparision and robustness purposes. Our final issue pertains to the geographical coverage of the existing literature. The multilateral developing country studies on the determinants of export specialization tend to focus on countries in Sub-Saharan Africa and the bilateral developing country studies look at the larger developing countries in South America. Policy conclusions derived from these studies may not be appropriate for smaller developing countries. Indeed, several authors argue that Caribbean economies because, of their unique historical antecedence behave differently, not only from developed countries but from other developing countries, and require therefore separate empirical analyses that capture their unique features and idiosyncrasies (Seers, 1963; Pantin, 1980). Our work is intended to fill the gap in the empirical literature by looking at the determinants of export specialization in the context of a small developing country in the Caribbean.

Trinidad and Tobago represents an interesting case for examining the determinants of export specialization because the country has actively used trade policy to promote industrial development. Traditionally, Trinidad and Tobago was regarded as a monocultural, hydrocarbon based economy. Over the years, the country embarked on several strategies to diversify its economic base as part of its overall economic development strategy. These strategies ranged from Import Substitution industrialization (ISI) in the 1950s, to Regional Import Substitution Industrialization (RISI) in the 1960s with the formation of CARIFTA in 1968, to regional economic integration with the establishment of CARICOM in 1973. CARICOM called for the liberalization on all intra-regional trade and for a customs union though the phased introduction of a Common External Tariff (CET). Neither goal was achieved. In fact the model ran into difficulties almost as soon as it was adopted as a result of the oil price shock late 1973. This produced sharp divergences in the economic fortunes of CARICOM's net energy importing countries and its sole net energy exporting state; and led to a series of defensive actions by the most adversely affected countries that impacted heavily on intra-regional trade. The situation was made worst by acute political and ideological differences that emerged within the Community. In the 1980s, the debt and adjustment crises and the rise of neo-liberal policies drove the final nail in the coffin of the model.

However, in the decade of the 1990s, largely influenced by the neo-liberal policies of the IMF and the World Bank, significant steps were taken to deepen and strengthen the regional integration movement. Starting in 1993, the CARICOM countries agreed to a four-phased reduction of the Common External Tariff (CET) aimed to reduce the CET to 0-20% points range (Sadikov, 2008). In phase 1 (January to June 1993) it was proposed that tariffs be reduced to between 0-35%; phase 2 (January to June 1995) a reduction between 0-30% was proposed; phase 111 (January to June 1997) a reduction between 0-25% and phase IV (January-June 1998) a reduction between 0-20%. Notwithstanding some implementation delays, by 2008, the new CET was introduced by 11 of the 13 participating CARICOM members and the average tariff of CARICOM countries had fallen significantly (World Bank, 2008).[7] Also, over the period of the 1990s and early part of the 2000s CARICOM entered into reciprocal bilateral trade agreements with a several neighbouring countries with relatively huge populations. These include Venezuela, Costa Rica, Dominican Republic and Cuba. Further, Trinidad and Tobago has been a beneficiary of non-reciprocal preferences from North American and European Countries. Over the period of our study (1996-2009), access to these markets was expanded due to European Enlargement (see Table A2-5 in Appendix for details). Therefore, by examining the determinants of export specialization in the context of Trinidad and Tobago we are able to examine the policy relevant issues of the role of both reciprocal and non-reciprocal preferences in fashioning export specialization patterns. Interestingly, during our study period, the country experienced phenomenal export growth. As shown in Figure A2-1 in the Appendix, the value of exports rose from approximately US$ 2.3 billion in 1996 to US$ 18.4 billion in 2008 before falling back to $US 9.2 billion at the end of the period.[8]

[7] Also, in the decade of the 1990s various initiatives were undertaken towards the establishment of a Caribbean Single Market and Economy (CSME).

[8] Note that a significant part of this increased export value is attributed to terms of trade improvements caused by rising oil prices (the country's main export product). Also note that, the decline in export value at the end of the period seems to suggest the global financial crisis negatively impacted exports.

2.4 The Empirical Model Specification

Our primary objective is to explore the various factors driving export specialization. We seek to exploit the variations in export specialization across time and across export destinations. In line with the model specification adopted by Parteka and Tamberi (2008) and several other empirical studies, we model export specialization as a function of the level of economic development, the size, the level of endowment, the nature of trade policy, the quality of institutions and the geographical characteristics of the export destinations. The primary difference between our model and Parteka and Tamberi (2008) is that, while they explain export specialization based on the characteristics of exporter countries, we examine the issue using export destination characteristics. Our focus is on the role of export destination characteristics (rather than exporter characteristics) in fashioning export specialization pattern because this issue is relatively unexplored in empirical studies. We specify two econometric models.

Our first model includes both time and country (importer) fixed effects and is specified as follows:

$$\begin{aligned} ExSPEC_{ijt} &= \beta_0 + \beta_1 ECONDEV_{jt} + \beta_2 SIZE_{jt} + \beta_3 ENDOWMENT_{jt} + \beta_4 POLICY_{jt} \\ &+ \beta_5 INSTQUALITY_{jt} + \eta_t + \phi_j + \varepsilon_{jt} \end{aligned} \qquad \textbf{2.2}$$

Where,

ExSPEC= {Herfindahl index};

ECONDEV= {LnGDPpc}; SIZE= {LnGDP, LnPopulation);

ENDOWMENT= {LnFuelResource}; POLICY= {AvgTariff, CARICOM, NonRecipPref};

INSTQUALITY= {Governance}; η *= {Time Fixed Effects};*

ϕ *= {Country Fixed Effects};* and ε *= {Error term}.*

$\beta_1 \lesseqgtr 0$, $\beta_2 \lesseqgtr 0$, $\beta_3 > 0$, $\beta_4 \lesseqgtr 0$, and $\beta_5 < 0$

In the above specification (equation 2.2), *i* indicates the exporter country (Trinidad and Tobago), *j* indicates the export destination and *t* indicates time. Thus, the dependent variable *(ExSPEC$_{ijt}$)* is the export specialization of Trinidad and Tobago relative to a particular export destination *j* in a particular year *t* and is measured by the Herfindahl index as indicated earlier in equation 2.1. We provide the descriptions and sources of all the variables in our model in a later section of this chapter.

We proxy the level of economic development in export destinations *(ECONDEV$_{jt}$)* by log per capita Gross Domestic Product *(LnGDPpc)*. Our apriori expectation is that the effect of the level of economic development of export destinations on the level of export specialization is ambiguous. Thus, the coefficient β_1 is expected to be either positive or negative. The ambiguity emanates from the fact that authors have expressed mixed views on the nature of the relationship. To illustrate, some authors such as Sandberg et al. (2006), Amurgo-Pacheco and Pierola (2007) and Dutt el al. (2008) argue that the level of export specialization between pairs of countries is a decreasing function of the per capita GDP of the export destination. They argue that GDP per capita of the export destinations serves as an indicator of the capacity to import goods and countries with higher GDP per capita are expected to have greater purchasing power, thus could import a wider range of goods and the export mix to these countries are likely to be more diversified than countries with lower per capita GDP. Thus according to this perspective, the level of economic development negatively influences the export specialization pattern. However, other authors argue that importer countries with greater levels of economic development tend to have relatively diversified production bases and therefore are more self-sufficient and trade less (Bebczuk and Berrettoni, 2006). Thus from this perspective, the level of export specialization increases with level of economic development of export destinations. In light of the foregoing, the expected sign on *LnGDPpc* could be positive or negative.

The next variable in our model captures country size of the export destinations *($SIZE_{jt}$)*, and is measured both in geo-demographical and economic terms. In geo-demographical terms, size of export destinations is captured by log population size of export destinations *(LnPopulation)* and in economic terms size is captured by the log Gross Domestic Product of export destinations *(LnGDP)*. We expect country size of export destinations to have an ambiguous effect on export specialization and thus the coefficient β_2 could be either positive or negative (Sandberg et al., 2006). Some authors argue that larger countries have a relatively diversified production base and are therefore more self-sufficient and less reliant on international trade, implying that exports to larger countries are more specialized (Brada and Mendez, 1983; Linnemann, 1966). Thus from this perspective, a positive relationship is expected between export specialization and country size of export destinations. However, as Amurgo-Pacheco and Pierola (2007) argue trading with larger markets increases the probability of finding demand for new products, thus the range of products exported to larger markets is greater. This implies that exports going to larger countries could be more diversified than in the case of exports going to smaller economies. Thus from this perspective, a negative relationship is expected between export specialization and country size of export destinations.

We proxy endowment in export destinations *($ENDOWMENT_{jt}$)* by the log share of fuel exports in total merchandize exports *(LnFuelResource)* (also see Parteka and Tamberi, 2008). Our endowment variable is intended to capture endowment similarity or dissimilarity between Trinidad and Tobago and the various export destinations. One of the distinctive features of the Trinidad and Tobago economy is its heavy dependence on fuel exports. Using other forms of physical endowments like labour, capital and human capital would have been misleading in that one could observe an export destination having similar physical endowment pattern with Trinidad and Tobago yet the resource endowments are vastly different. We expect the sign on our endowment variable to have a positive sign. Indeed we expect Trinidad and Tobago's exports will be more specialized to export partners with a similar endowment pattern. Theoretical support for this perspective can be deduced from the standard Heckscher-Ohlin type model which predicts a positive relationship between endowment and export specialization pattern.

We acknowledge the fact that the nature of trade policy in existence in export destinations is expected to affect the export specialization pattern as trade policy can act to either foster or hinder trade. We therefore capture the effect of trade policy in export destinations *($POLICY_{jt}$)* with variables capturing the effect of trade preferences and trade costs. We use two dummy variables (categorical variables) to capture the effect of trade preferences, while we use another variable (quantitative in nature) to capture the effect of trade costs. In terms of trade preferences, Table A2-5 in Appendix shows a list of export markets to which Trinidad and Tobago's exports have preferential access, the type of agreement and the year the agreement was enforced. It is clear from the table that there are two kinds of preference arrangements which Trinidad and Tobago enjoys in export markets: reciprocal preferences and non-reciprocal preferences. Reciprocal preferences exist mainly with regard to trade with CARICOM countries as well as other countries such as Venezuela, Costa Rica, Dominican Republic and Cuba, while non-reciprocal preferences exists largely with respect to trade with European and North American countries. To capture the effect of reciprocal preferences we use a dummy variable *(CARICOM)*, while we capture non-reciprocal preferences with another dummy variable denoted *(NonRecipPref).* These dummy variables switch on and take the value of one if the specific type of preference is enjoyed and is zero otherwise. Our apriori expectation is that the expected signs on the dummy variables should be negative indicating that the enjoyment of preferences would reduce the degree of export specialization. Indeed, some authors argue that by participating in preferential trading arrangements, trade cost associated with exporting is reduced; implying a wider range of firms will find it profitable to sell to the member country. Consequently, the range of goods exported to the member country is expected to increase (Amurgo-Pacheco and Pierola, 2007; Dutt et al., 2008; Volpe-Martincus and Gomez, 2009).

Our next policy variable captures trade costs and is measured by the average tariff of export destinations *(AvgTariff)*. We proxy average tariff of the export destination with the simple average tariff applied by the export destination to all other countries. We expect the sign on this variable to be ambiguous. Our justification for this is as follows. We know that Trinidad and Tobago export goods to two types of markets: one in which there is preferential access and the other in which there is no preferential market access. In export markets where there is no preferential market access, exports from Trinidad and Tobago are subjected to the average tariff which increases exporting costs. Therefore, the higher the average tariff, the smaller the range of goods exported, so the level of specialization increases. Thus the expected effect here would be positive. Comparatively, in export markets to which Trinidad and Tobago's products enjoy preferential access, it means that exports from other countries are subjected to the tariff in existence. Thus in this case, the higher the average tariff, the higher the margin of preferences Trinidad and Tobago's goods enjoys, this increases the competitiveness of a greater number of export products from Trinidad and Tobago relative to those from third countries. The implication of this is that the range of export products is expected to increase thus decreasing the level of specialization (Volpe-Martincus and Gomez, 2009). In general, the influence of the average tariff on specialization will depend on the relative strength of the two effects; hence the expected sign on the *AvgTariff* variable is ambiguous.

We capture the quality of institutions and governance in export destination *($INSTQUALITY_{jt}$)* by a variable denoted *(Governance)*. We acknowledge that the export specialization pattern between Trinidad and Tobago and its trading partners would vary based on the quality of institutions and governance in these export markets. We recognize that the quality of institutions and governance could influence both the opportunities for, and the costs of trade, and consequently influence the opportunities for export diversification. We therefore expect that improvements in the quality of institutions and governance in export destinations to be among the negative determinants of export specialization. That is, "better" institutions and governance in export destinations implies greater diversification and less export specialization. The rationale for this is simple. As we have seen earlier, authors such as De Groot et al. (2003) argue that "better" institutions imply less uncertainty about contract enforcement and general economic governance, thus less transactions cost and increased trade. In order to capture the overall quality of institution and governance in export destinations we constructed a composite index *(Governance)* using the Worldwide Governance Indicators of the World Bank.

Also included in the model are η_i and ϕ_j that measure time and country fixed effects, respectively. Time fixed effects are included to capture unexplained variations in the dependent variable over time. That is, it captures all influences such as macroeconomic effects that affect the dependent variable that vary over time but constant cross-sectionally. Country fixed effects are included to capture all influences that affect export specialization that vary across export destinations.

We also specify an alternative model where we control for geographic characteristics of the export destinations by including a variable, *(GEOGPRAPGY$_{ij}$).* We proxy geography with the log bilateral distance between Trinidad and Tobago and each export destination *(LnDistance)*. We therefore specify the following alternative model:

$$\begin{aligned} ExSPEC_{ijt} &= \beta_0 + \beta_1 ECONDEV_{jt} + \beta_2 SIZE_{jt} + \beta_3 ENDOWMENT_{jt} \\ &+ \beta_4 POLICY_{jt} + \beta_5 INSTQUALITY_{jt} + \beta_6 GEOGRRAPHY_{ij} + \eta_t + \varepsilon_{jt} \end{aligned} \qquad \textbf{2.3}$$

We expect distance from export markets to influence export specialization patterns as distance influences transport costs (and therefore trade costs) and affects the ability of the exporting countries to operate intensively in the international market (Venables and Limao, 2002). Since distance is time invariant, to allow for its estimation country fixed effects are excluded from the specification in equation 2.3. We expected that the level of export specialization between two countries to be an increasing function of their geographic distance (Agosin et al., 2009). Indeed, more distant countries face higher trade cost (export cost, international transport cost and domestic market entry cost) reducing the profitability of exporting products (Amurgo-Pacheco and Pierola, 2007; Dennis and Shepherd, 2007).[9] The expected sign on β_6 is therefore positive.

2.5 The Data

2.5.1 Data Description and Sources

The description and sources of the various variables in the models are presented in Table A2-6 in the Appendix. To construct our dependent variable we use HS 4-digit export data for Trinidad and Tobago for the period 1996-2009. Our dataset consists the HS product code, the years and the export value to approximately 175 export destinations. We sourced this data from the Central Statistical Office (CSO) of Trinidad and Tobago. We obtained data on *GDP* (constant US$ 2005) for the period 1996-2009 primarily from the World Development Indicators of the World Bank, and where necessary we supplemented missing observations using Penn World Tables (PWT 6.3). We obtained data on population size *(Population)* of export destinations for the period 1996-2009 from the World Development Indicators of the World Bank, and where required we

[9] The microeconomic foundation for this relationship has been provided by Melitz (2003).

supplemented missing data using Penn World Tables (PWT 6.3). We therefore calculated *GDPpc* using our information on GDP and population. Further, we obtained data on *FuelResource* for the period 1996-2009 from World Development Indicators of the World Bank. Moreover, we obtained data for the construction of *CARICOM* and *NonRecipPref* from Administrative Reports of the Ministry of Trade and Industry, Government of Trinidad and Tobago. In addition, we obtained data on average tariffs imposed by export destinations *(AvgTariff)* for the period 1996-2009 from the World Development Indicators of the World Bank, and where necessary we supplemented missing observations using data from World Integrated Trade Solution (WITS) database. In addition, we constructed the institutional quality and governance index *(Governance)* using the simple arithmetic means of the scores of the scores of six sub-indices of the Worldwide Governance Indicators. They are Voice of Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. Each index captures some related aspects of the quality of institutions and governance. They either reflect the political process, the quality of the state apparatus and its policies, or the success of governance.[10] Each of the sub-indices range in values from -2.5 to +2.5 with higher values corresponds to better governance outcomes and better institutional quality. We obtained data on the institutional quality and governance variables from the Worldwide Governance Indicators of the World Bank. Between 1996 and 2002, only two year values for the Governance Indicators are available but thereafter, data on the variables are available on an annual basis up to 2009. Thus, we calculate values for the years 1997, 1999 and 2001 using the average values for the year preceding and the year after. Finally, we obtained data on distance between Trinidad

[10] Voice of Accountability reflects the extent to which citizens can participate in selecting government and hold them accountable for the actions taken. Political Stability refers to the perceived likelihood of the government being destabilized or overthrown by unconstitutional interference or excess violence against persons and possessions. Government Effectiveness is a measure for the quality of government inputs. It represents, amongst others, the perceived quality and independence of the bureaucracy. Regulatory Quality is directly focuses on the quality of implemented policies. It includes the perceived incidence of policies that inhibit the market mechanism, and excessive regulation of foreign trade and business development and as such closely reflects the transactions costs that result from policy intrusion by the state in private trade. Rule of Law indicates the quality of the legal system. It focuses on the quality of the legal system and the enforceability of contracts. Control of Corruption captures the extent of lawless or unfair behavior in public-private interactions.

and Tobago and export destinations *(Distance)* from CEPII (*Centre d'Estudes Prospectives et d'Informations*).[11] Here bilateral distances (in kilometres) are calculated as the distance between the main cities of both countries.

2.5.2 Sample Characteristics

The summary statistics of the dependent and independent variables are presented in the table below.

Table 2.4: Descriptive Statistics on Dependent and Independent Variables

Variable	Observations	Mean	Std. Dev.	Min	Max
ExSPEC	1535	0.645	0.303	0.036	1
LnGDPpc	1425	8.980	1.398	-1.500	11.339
LnPopulation	1531	15.604	2.343	9.670	21.010
LnGDP	1425	24.881	2.373	14.843	30.209
LnFuelResource	1238	1.721	1.373	0	4.612
LnDistance	1535	8.531	1.041	5.083	9.834
Governance	1486	0.253	0.914	-2.177	1.897
AvgTariff	973	8.546	6.509	0	47.920
CARICOM	1535	0.130	0.336	0	1
NonRecipPref	1535	0.166	0.372	0	1

As shown in Table 2.4 above, the average level of export specialization for Trinidad and Tobago is 0.64. This suggests that Trinidad and Tobago exports is relatively highly specialized and confirms some of our earlier results. The dependent variable ranges in value from 0.03 to 1, thus it approaches zero without actually reaching it. Note that our sample consists of 1535 observations and some of our explanatory variables (in particular *AvgTariff*) are affected by missing data.

[11] http://www.cepii.fr/anglaisgraph/bdd/distances.htm.

We provide the correlation matrix of the variables in our sample in Table A2-7 in the Appendix. An examination of the correlation matrix highlights several interesting observations. Firstly, our institutional variable *(Governance)* is highly positively correlated with *LnGDPpc*. Secondly, *LnGDP* is highly positively correlated with *LnPopulation*. Thirdly, CARICOM is highly negatively correlated with *LnDistance*. The high correlation between some of our explanatory variables is an issue we must consider in our estimations to guard against possible problems of multicollinearity.

We then looked at the bilateral relationships between the dependent variable and some of the independent variables in our model by examining both the second column in the correlation matrix as well as scatter plots of the relationships that are presented in Figure A2-2 to Figure A2-8 in the Appendix. Again, the findings are in keeping with our apriori expectations on the relationships between the variables. First, we find positive relationships between export specialization and the following variables: *LnPopulation*, *LnFuelResource* and *LnDistance*. Notably, the relationship is strongest with respect to *LnDistance*. Second, we find negative relationships between the export specialization and each of the following independent variables: *LnGDPpc*, *LnGDP*, *AvgTariff*, *CARICOM*, *NonRecipPref* and *Governance*. The correlation is strongest with respect to *CARICOM* and weakest with respect to *NonRecipPref*.

Later, as part of the robustness checks in our estimations, we use an alternative measure of our dependent variable where our dependent variable is measured as the number of products (defined at HS 4-digit level) exported to the various markets in specific years. We present data on the number of goods exported (both for the full sample and for manufactured goods only) in Table A2-8 in the Appendix. It is evident from the table that (for the full sample) the number of goods increased steadily at the beginning of the period and declined at the end of the period. The decline at the end of the period may be due to the effect of the global financial crisis. With respect to manufactured goods, a similar pattern of growth and eventual decline is evident. Notably, manufactured goods comprises approximately half (49%) of all the goods exported. The number of goods exported (overall) to the 12 major trading partners is shown in Table A2-9 in the Appendix. Relatively large numbers of products are exported to countries such as Barbados (7,149), Guyana (6,537) and the USA (6,177). Comparatively, smaller numbers of products are exported to countries like Spain (156), Argentina (224) and Mexico (409). Also, it is evident that for most countries, the number of goods exported declined at the end of the period. Exceptions in this regard were Venezuela and Mexico where increases seem evident. Also, the number of manufactured goods exported to the 12 major trading partners is shown in Table A2-10 in the Appendix. Again relatively large numbers of manufactured goods are exported to Barbados (3,634), Guyana (3,233) and the USA (2,763). Comparatively, smaller numbers of manufactured goods are exported to countries like Spain (47), Argentina (72) and Mexico (160). Also, it is evident that for most countries, the number of manufactured goods exported declined at the end of the period.[12]

2.6 Estimation Issues and Strategy

In order to derive economically meaningful estimates from our specified models, the choice of estimation strategy is an important issue. Notably, our dependent variable is a factional response variable (or a limited range variable), in that, it is bounded between zero and one.[13] The bounded nature of this variable and the possibility of observing values at the boundaries raise interesting functional form and inference issues. A traditional solution to this problem is to perform a logit transformation on the data. To

[12] Note that declines in the number of products especially at the end of the sample period may have been due to the effect of the financial crisis on the number of products exported.
[13] Note that there are no values of zero for the dependent variable in the sample. Also, note that other examples of fractional response variables include pension plan participation rates, firm market share, proportion of debt in the financing mix of firms and proportion of exports in total sales.

illustrate, if we assume our dependent variable is called *y* and your independent variables are called *x* with coefficients β. Then, one assumes that the model that describes *y* is as follows:

$$y = \frac{1}{1 + \exp(-x\beta)} \qquad \textbf{2.4}$$

If one then performs the logit transformation, the result is the following:

$$\ln\left(\frac{y}{(1-y)}\right) = x\beta \qquad \textbf{2.5}$$

We have now mapped the original variable, which was bounded by 0 and 1, to the real line. One can now fit this model using OLS but this does not ensure the predicted values lie in the unit interval. Of course, one cannot perform the transformation on observations where the dependent variable is 0 or 1; the result will be missing values, and those observations will subsequently be dropped from the estimation sample. Since our sample contains values of 1 for the dependent variable, we will lose degrees of freedom if this approach is adopted. Also by using OLS, we falsely assume normality of the dependent variable and this could lead to incorrect estimation results and conclusions. Moreover, other OLS assumptions may be violated. For example, we may be faced with non-constant variance for the values of the dependent variable and the error terms are generally not normally distributed (Papke and Wooldridge, 1996; Ramalho et al., 2011).

Another approach would be to use a Tobit model. But, as Ramalho et al. (2011) argue, a Tobit model is appropriate to describe censored data in the interval [0,1] but its application to data defined only in that interval is not easy to justify. They argue that observations at the boundaries of a fractional variable are a natural consequence and not of any type of censoring. Further, they argue that the Tobit model is very stringent in terms of assumptions, requiring normality and homoskedasticity of the dependent variable, prior to censoring.

Given the above considerations, a more suitable approach, as suggested by Papke and Wooldridge (1996), is to estimate using the Fractional Logit Generalized Linear Model (GLM). GLM is a flexible generalization of Ordinary Least Squares regression. It generalizes linear regressions by allowing the linear model to be related to the response variable via a link function and by allowing the magnitude of the variance of each measurement to be a function of its predicted value. These models consist of three basic elements. The first is a probability distribution from the exponential family. The second is a linear predictor $\eta = X\beta$. And the third is a link function g such that $E(Y) = \mu = g^{-1}(\eta)$.

In view of the foregoing, we estimate our models using Fractional Logit GLM as suggested by Papke and Wooldridge (1996) and use OLS as part of our robustness checks. To address the issue of the high collinearity among some of our explanatory variables, we include highly correlated variables in alternative specifications thus minimizing concerns of multicollinearity.

2.7 Empirical Results

In this section, we present our baseline results derived from Fractional Logit GLM estimations of both equation 2.2 and 2.3. Following Pake and Wooldridge (1996), the

GLM is distributed binomially and the link function is logit.[14] All our baseline results are generated using the Herfindahl index as the measure of export specialization. We present results for the full sample, manufactured goods only and non-manufactured only goods. Thereafter, we perform several robustness checks using OLS, alternative model specifications and the alternative count measure to capture our dependent variable.

[14] Later as part of the robustness checks when we change the dependent variable to Count, we change the distribution to poisson and the link to logit as recommended by Ballinger (2004).

2.7.1 Baseline Results

Our baseline estimation results are presented in the table which follows. We derive these results based on Fractional Logit GLM estimations of equation 2.2 and 2.3 for the full sample, manufactured goods and non-manufactured goods.

Table 2.5: Fractional Logit GLM Estimation Results on the Determinants of Export Specialization (various samples).

	Full Sample		Manufactured Goods		Non-Manufactured Goods	
	(1)	(2)	(3)	(4)	(5)	(6)
	equation 2.2	equation 2.3	equation 2.2	equation 2.3	equation 2.2	equation 2.3
VARIABLES	ExSPEC(HHI)	ExSPEC(HHI)	ExSPEC(HHI)	ExSPEC(HHI)	ExSPEC(HHI)	ExSPEC(HHI)
LnGDPpc	-1.314**	-0.297***	-1.644**	0.0431	-1.151**	-0.307***
	(0.564)	(0.0798)	(0.769)	(0.116)	(0.483)	(0.0845)
LnPopulation	-2.503	-0.309***	-3.179	-0.159***	-0.435	-0.293***
	(1.530)	(0.0275)	(2.121)	(0.0379)	(1.516)	(0.0286)
LnFuelResource	-0.0986	0.0606	0.0212	-0.00779	-0.114	-0.00270
	(0.0998)	(0.0392)	(0.122)	(0.0517)	(0.0972)	(0.0402)
AvgTariff	0.0188	0.0122	-0.0563**	-0.00828	0.0176	0.0104
	(0.0126)	(0.00857)	(0.0249)	(0.0115)	(0.0138)	(0.00900)
CARICOM	-0.110	-1.310***	0.385	-2.201***	0.107	-1.058***
	(0.376)	(0.222)	(0.575)	(0.299)	(0.413)	(0.221)
NonRecipPref	0.599	0.553***	-0.0535	0.0607	1.554**	0.460***
	(0.429)	(0.120)	(0.688)	(0.151)	(0.635)	(0.124)
Governance	0.457*	-0.272***	0.184	-0.684***	0.305	-0.248**
	(0.262)	(0.0984)	(0.397)	(0.151)	(0.247)	(0.104)
LnDistance		0.631***		0.502***		0.585***
		(0.0674)		(0.0842)		(0.0713)
Constant	49.80**	2.605***	62.20*	-0.797	18.40	3.067***
	(23.12)	(0.976)	(32.07)	(1.352)	(23.20)	(0.995)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	No	Yes	No	Yes	No
Observations	872	872	662	662	823	823

Notes: The Herfindahl index (HHI) is the dependent variable. Robust standard errors in parentheses and statistical significance is indicated by *** p<0.01, ** p<0.05, * p<0.1. GLM was done using family (binomial) link (logit), with robust standard errors.

As show in Table 2.5 above, the coefficients on the variable *LnGDPpc* are negative and highly significant in most regressions. This suggests that for various types of goods Trinidad and Tobago's exports are less specialized the greater the level of economic development of its trading partner. These results seem quite plausible and may be attributed to the fact that export destinations with higher GDP per capita are expected to have greater purchasing power, therefore can import a wider range of goods, thus the export pattern is likely to be more diversified (less specialized) than export destinations with lower per capita GDP. Our results with respect to *LnGDPpc* are consistent with those of Kim and Kim (2012) and corroborate those of several other empirical studies. With regard to the variable *LnPopulation*, we find the coefficients negative and highly significant in all the regressions which exclude country fixed effects. This suggests that there is some evidence indicating that Trinidad and Tobago's export specialization decreases with country size of export destinations but our results seem sensitive to the inclusion of country fixed effects. Intuitively, trading with larger markets increases the probability of finding demand for new products, and thus, the range of products exported to larger markets is greater. Our findings in this regard seem plausible and are consistent with several previous empirical studies which find export specialization is reduced with larger country size.[15] Looking at the variable *LnFuelResource*, the coefficients on this variable are not significant any regression suggesting that endowments do not matter for export specialization. With regard to *AvgTariff*, the coefficient on this variable is only significant in column 3 suggesting that for manufactured goods there is some evidence Trinidad and Tobago's export is less specialized the higher the average tariff of trading partners. This finding seems to be in line with those of Sanguinetti et al. (2004) which report a negative and significant relationship between export specialization and tariffs in export destinations in a study on Argentina. However, our results differ from those of Volpe-Martincus and Gomez (2009) which report a positive and significant relationship between the two variables in a study on Columbia.

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[15] In some specification, we use *LnGDP* instead of *LnPopulation* and our results are unaffected. Our results in this regard are in line with those of Kim and Kim (2012).

Turning our attention to the effect of preferences, we observe the variable *CARICOM* is negative and highly significant in all regressions excluding country fixed effects. This suggests there is some evidence to indicate that Trinidad and Tobago's exports are less specialized (more diversified) for exports to CARICOM partners, however our results seem sensitive to the inclusion of country fixed effects. Our findings seem quite plausible as we expect CARICOM preferences to reduce trade costs thereby increasing opportunities for trade thus reducing the level of export specialization. Evidently, regional integration is contributing to trade expansion. Our results with respect to preferential trade agreements are consistent with those of Sanguinetti et al. (2004) and Volpe-Martincus and Gomez (2009), but differs from Kim and Kim (2012) who finds a positive effect of preferential trade agreements on the specialization pattern of Chilean exports. Interestingly, the coefficients on *NonRecipPref* are positive and significant in column 2, 5 and 6. This suggests that there is some evidence to indicate that non-reciprocal preferences increase Trinidad and Tobago's export specialization. Although this finding is not in line with our apriori expecations, it is not entirely surprising given that much of the preferences granted under the non-reciprocal preferences schemes apply to specific products and this may be contributing to increasing export specialization. Also, the preferences are granted by developed countries in North American and Europe, and competition in these exporter markets is greater. This implies fewer export firms from Trinidad and Tobago could find and maintain profitable export relationships in these markets. This is exacerbated by the fact that Trinindad and Tobago firms produce at a smaller scale and thus are unable to fully exploit the benefits of economies of scale. Our results may also suggest that there are other barriers to trade operating in these developed country markets, or Trinidad and Tobago manufacturers are unaware and thus unable to exploit available oppotuninies which the preferences offer.[16] Moreover, Gamberoni (2007) argues that preference schemes can create

[16] For example, there may be technical restrictions pertaining to rules of orignins, where tariff-free market acess is only granted if the share of the good actually produced in the exporting country exceeds some threshold. Also, there may be sanitary standards that restrict the entry of agricultural products on health grounds.

incentives to specialize and may actually reduce incentives to diversify. He argues that preference schemes could contribute to locking in developing countries even more decisively into existing structures. Our results with respect to non-reciprocal preferences are in line with those of De La Cruz (2008) and Dutt et al. (2008) which suggest that GSP preferences in export destinations increase export specialization.

Looking at the effect of institutional quality and governance, the coefficient on variable *(Governance)* is negative and significant in all regressions excluding country fixed effects. This suggests that there is some evidence that "better" institutional quality and governance in export destinations are associated with less export specialization but our results seem sensitive to the inclusion of country fixed effects. Our findings seem plausible as "better" institutions imply less uncertainty about contract enforcement and general economic governance, thus less transactions cost and increased trade (less specialization).

Turning our attention to the variable capturing the effect of geography (*LnDistance),* not surprisingly, we see the coefficient of this variable is positive and highly significant in all regressions where it is included. This suggests that there is strong evidence that export specialization increases with distance of Trinidad and Tobago's export destinations. This seems quite plausible as we expect, firms exporting to more distant countries to face higher trade cost, reducing the profitability of exporting new products. Trade is thus more specialized the further away the export destination. Our findings here are in line with those of Parteka and Tamberi (2008) and Kim and Kim (2012) that report positive relationships between export specialization and distance.

2.7.2 Robustness Checks

To test the robustness of our results, we proceed in three ways. Firstly, we estimate the models using OLS. Secondly, to control for possible multicollieарity bought about by the high correlation between our economic development variable *(GDPpc)* and our institutional quality and governance variable *(Governance)*, we re-estimate our regressions excluding the variable *LnGDPpc*. Thirdly, we change the measure of our dependent variable from Herfindahl index to Count and re-estimate the regressions. The results of our robustness checks are presented in what follows.

Alternative Estimation Strategy

Table A2-11 in the Appendix reports the results for OLS estimation for the full sample, for manufactured goods only and non-manufactured goods only. Evidently, not only are our OLS results consistent with each other, but with our previous Fractional Logit GLM results for the various categories of goods. In the case of manufactured goods however, some minor differences seem noticeable from our earlier Fractional Logit GLM results. In this regard, the variable *LnGDPpc* loses its significance in column 3 and *AvgTariff* is now significant only at the 10% level in the same column.

Alternative Specification

The next aspect of our robustness checks entails estimating our regressions excluding *LnGDPpc*. The results for the full sample, manufactured goods and non-manufactured goods are shown in Table A2-12 in the Appendix. As shown in Table A2-12, the results for the full sample are largely unaffected by the exclusion of the variable (*LnGDPpc*). There are however two noticeable exceptions. First, interestingly, the variable *AvgTariff* gains significance with positive sign in columns 1 and 2. What this suggests is that higher tariff increases the degree of export specialization. Second, our institutional quality and governance variable *(Governance)* in column 1 loses its significance. As it pertains to manufactured goods, our results are generally unaffected by the exclusion of *LnGDPpc*. The only noticeable difference is that *AvgTariff* loses its significance in column 3. Finally, as it relates to non-manufactured goods, the only noticeable difference is that the coefficient on the variable *AvgTariff* is now positive and significant in column 6.

Alternative Definition of Dependent Variable

The final aspect of our robustness checks involve changing the dependent variable and using the number (count) of HS 4-digit products exported to each destination in each year to measure export specialization instead of the Herfindahl index. Note that because the nature of the dependent variable is now different, for the GLM estimations, the family of choice is now Poisson and the link of choice is now the log link (Balinger, 2004; Dennis and Sheppard, 2010). Also note that the interpretation of the signs on the coefficients changes with the new dependent variable. A positive sign now indicates that the particular variable reduces specialization, and a negative sign indicates that the particular variable increases export specialization. We estimate our regressions for the full sample, for manufactured goods and non-manufactured goods and the results are presented in the table which follows.

Table 2.6: Fractional Logit GLM Estimation Results on the Determinants of Export specialization with count as the dependent variable (various samples).

	Full Sample		Manufactured Goods		Non-Manufactured Goods	
	(1)	(2)	(3)	(4)	(5)	(6)
	equation 2.2	equation 2.3	equation 2.2	equation 2.3	equation 2.2	equation 2.3
VARIABLES	ExSPEC(Count)	ExSPEC(Count)	ExSPEC(Count)	ExSPEC(Count)	ExSPEC(Count)	ExSPEC(Count)
LnGDPpc	0.762***	0.0566	0.663***	0.0198	0.719***	0.0450
	(0.158)	(0.0875)	(0.153)	(0.0936)	(0.153)	(0.0863)
LnPopulation	1.030***	0.366***	0.772***	0.312***	1.036***	0.358***
	(0.352)	(0.0284)	(0.289)	(0.0293)	(0.349)	(0.0290)
LnFuelResource	0.0243	-0.208***	0.00713	-0.187***	0.0236	-0.204***
	(0.0207)	(0.0400)	(0.0161)	(0.0383)	(0.0207)	(0.0396)
AvgTariff	-0.0115***	-0.00867	-0.00930***	-0.00780	-0.0113***	-0.00798
	(0.00404)	(0.00716)	(0.00357)	(0.00721)	(0.00399)	(0.00720)
CARICOM	0.254*	1.871***	0.262*	1.741***	0.258*	1.848***
	(0.151)	(0.225)	(0.147)	(0.208)	(0.151)	(0.222)
NonRecipPref	-0.538***	0.727***	-0.582***	0.906***	-0.537***	0.745***
	(0.166)	(0.104)	(0.225)	(0.105)	(0.170)	(0.104)
Governance	-0.0329	0.588***	-0.0393	0.517***	-0.0299	0.582***
	(0.0369)	(0.104)	(0.0365)	(0.104)	(0.0364)	(0.103)
LnDistance		-1.089***		-1.013***		-1.076***
		(0.0706)		(0.0667)		(0.0704)
Constant	-20.69***	5.638***	-15.64***	6.329***	-20.40***	5.771***
	(5.788)	(0.863)	(4.797)	(0.852)	(5.748)	(0.855)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	No	Yes	No	Yes	No
Observations	872	872	662	662	823	823

Notes: Robust standard errors in parentheses and statistical significance is indicated by *** p<0.01, ** p<0.05, * p<0.1. GLM was done using family (poisson) link (log), with robust standard errors.

As shown in Table 2.6 above, as it pertains to the full sample, several varaibles such as *LnPopulation*, *AvgTariff*, *CARICOM* and *NonRecipPref* gained significance with signs in line with our apriori expectations results and *Governance* loses its significance in column 1. Also, *LnGDPpc* loses it significance in column 2 and *LnFuelResource* gains significance in column 2. As it pertains to the results for manufactured goods, not only are they quite consistent with each other but with our earlier results for manufactured goods using the Hefindahl index. However, a few exceptions seem evident. Notably, *LnPopulation, CARICOM* and *NonRecipPref* are now significant and *Governance* loses its significance in column 3. Also in column 3, the sign on *AvgTariff* is now changed with high significance. In column 4, *LnGDPpc* loses significance and *LnFuelResource* gains significance. Also, in column 4, the sign on *NonRecipPref* is now changed with high significance. As it relates to non-manufactured goods, again our results are consistent with each other and similar to what we saw for non-manufactured goods using the Herfindahl index to measure export specialization. However, there are a few exceptions. Notably, *LnPopulation, AvgTariff and CARICOM* are now significant and *Governance* loses its significance in column 5. And, in column 6, *LnGDGpc* loses it significance and *LnFuelResource* gains significance. Also, in column 6, the sign on *NonRecipPref* is now changed with high significance. Again, we considered an alternative specification where we exclude *LnGDPpc* and our results with respect to the various samples remain quite robust as shown in Table A2-13 in the Appendix.

2.8 Conclusions

In this chapter, we set about to measure the bilateral export specialization pattern in the context of a small developing country, Trinidad and Tobago; and more importantly, to examine the various factors explaining these bilateral export specialization patterns. Our study covers the period 1996-2009 (a period of phenomenal export growth) and we estimate our regressions using mainly Fractional Logit Generalized Linear Model (GLM).

Several important and interesting findings emerged from our research. These findings confirm many of our theoretical priors and are in line with the findings of several empirical studies looking at the determinants of export specialization. First and foremost, we find Trinidad and Tobago exports to be highly specialized. This finding is not surprising and seems to be in keeping with the relative smallness and fuel-dependent nature of the economy. With regard to the factors explaining export specialization, we discover several key findings. First, in line with our apriori expectations, we find fairly robust evidence that higher levels of economic development (larger *GDPpc*) and greater size (larger *Population* or *GDP*) of export destinations reduce export specialization. Second, we find some evidence that Trinidad and Tobago's exports are more specialized to export destinations with which it has similar endowment pattern. However, this finding seems sensitive to the way export specialization is measured and the estimation strategy. Third, we discovered some evidence that Trinidad and Tobago's exports is more specialized the higher the average tariffs in export destinations. Fourth, not surprisingly, we find compelling evidence that regional integration with trade partners through CARICOM reciprocal preferences reduces export specialization. This supports the view that regional integration is contributing to trade expansion. By contrast, surprisingly, we find weaker evidence that non-reciprocal preferences encourage specialization. The effect of non-reciprocal preferences seems to be sensitive to the type of goods, estimation strategy and the way export specialization is measured. Fifth, in line with our apriori expectations, we find compelling evidence that better institutional quality and governance in export destinations reduce specialization. Sixth, as expected, we find cogent evidence that greater distance from export markets increases export specialization. In general our findings seem to be in line with our theoretical priors and consistent with several previous studies looking at the determinants of export specialization.

Our findings convey several key messages to policy makers which should serve to guide trade policy formulation. First and foremost, our findings highlight the fact that the long standing and important economic policy objective of the Government of Trinidad and Tobago to diversify the country's export base is a long way from being achieved. Indeed, Trinidad and Tobago's exports remain highly specialized. Further, our results suggest that if Trinidad and Tobago is to be successful in its export diversification efforts, reciprocal preferences (CARICOM) may be more effective than non-reciprocal preferences in achieving this objective. One plausible reason for this is the fact that non-reciprocal preferences may only be applicable to a limited range of products in comparision to reciprocal preferences. Our results therefore suggest that regional integration is very beneficial to Trinidad and Tobago and the process should be encouraged and enhanced. A possible approach to enhancing regional intergration could be though CARICOM-bilateral trading arrangements with other neighbouring countries such as Panama and Guatemala with relatively large populations. This will serve to expand the CARICOM market thus enabling member countries to exploit benefits associated with economies of scale. One critical issue that remains is the fact that trade with CARICOM countries may be occurring with many with low value commodities. This would suggest that trade with regions outside CARICOM may also be very important to sustain economic activity in CARICOM member states. With regard to non-reciprocal preferences, Trinidad and Tobago needs to continue to collaborate with its CARICOM neighbours to lobby larger countries in North America and Europe to reduce some of the institutional barriers to trade, and to expand the range of products covered under these non-reciprocal preference schemes in an effort to generate more beneficial trade. It may also call for greater trade promotion and trade facilitation in some of these larger markets to help companies gain and maintain access to these markets. These measures are also likely to enhance export diversification by ameliorating some of the obstacles to trade diversification that arise from the quality of institutions and governance in export markets by reducing transactions costs. In addition, greater efforts may need to be made to retool the private sector to more fully exploit existing market opportunities and to target new ones. In general, the fact that export specialization is influenced by export destination characteristics (some of which are natural) has severe consequences in terms of policy. It means that some of the measures to reduce specialization are outside the direct control of policy makers in Trinidad and Tobago. The task of diversify the country's export base is therefore not a simple one and requires actions not only on the domestic front but internationally. We believe the findings of our study have applicability that extends beyond Trinidad and Tobago, as some of the policy implications may be appropriate for other small developing countries which have economic structures similar to that of Trinidad and Tobago.

Our work contributes to the existing literature in several ways. First and foremost, we extent the geographical coverage of the literature on export specialization by looking at the phenomenon in the context of a small developing country to complement existing studies which focus on countries in Sub-Saharan Africa and South America. Also, we show that export destination characteristics (demand-side factors) do influence the pattern of bilateral export specialization. Our work therefore complements several existing studies that focus on the role of exporter characteristics (supply-side factors) in explaining export specialization. Further, we provide fresh evidence on the impact of both reciprocal and non-reciprocal preferences on export specialization. We also provide fresh evidence on the impact of tariffs on export specialization. Finally, we provide fresh evidence on the influence of institutional quality and governance in export markets on export specialization patterns, therefore adding to the newly emerging literature that looks at the impact of institutions and governance on trade.

Our study is not without some limitations that suggest the need for further research. Firstly, we captured trade policy by the average tariffs of the export destination, and in so doing; we failed to capture the effects of non-tariff barriers. Non-tariff barriers do have a significant influence on trade and their omission from our study could have introduced bias to our estimations. What is somewhat comforting is the fact that in some of our econometric specifications we include country fixed effects and we hope that the effects of non-tariff barriers are captured though these fixed effects. Our work could be enhanced in the future by including data on non-tariff barriers. We acknowledge however, that the procurement of adequate and reliable data on non-tariff barriers could present a significant challenge. Secondly, to capture the effect of regional integration, we used a dummy variable that takes the value of zero if the export destination is a member of CARICOM in the specific year and zero otherwise. The use of this dummy variable does not adequately capture changes in the degree of integration that may have taken place in the period of our analysis. During the period of our study, some CARICOM countries took significant steps towards the establishment of the CARICOM Single Market and Economy (CSME). Our work could be extended and enhanced by using some proxy to better capture changes in the degree of integration. Thirdly, our estimations could potentially have been affected by sample selection bias due to zero trade flows. Notably, the Herfindahl index is only defined with respect to bilateral trade partners with which Trinidad and Tobago had positive trade values in the period. Our results are based only on values for which there are positive trade. Therefore, the exclusion of zeros from our estimation may introduce possible bias in our coefficient estimates. In future work, as part of our robustness checks, we hope to introduce zeros and see the extent to which our results are affected. Further, we propose to expand the list of explanatory variable enabling our results to have wider policy relevance. We could control for the effect of things such as trade promotion, WTO membership of trade partners and language. Finally, a natural next step in this research seems to be the expansion of the study to capture all CARICOM countries. This would certainly shed light on the policy relevant issue of whether the factors affecting export specialization are the same for different types of CARICOM countries.

Appendix A2

Table A2-1: List of Export Destinations in Full Sample

AFGHANISTAN	CHAD	GUATEMALA	MAURITIUS	SLOVAKIA
ALBANIA	CHILE	GUINEA	MEXICO	SLOVENIA
ALGERIA	CHINA	GUYANA	MONGOLIA	SOMALIA
AMERICAN SAMOA	COLOMBIA	HAITI	MOROCCO	SOUTH AFRICA
ANGOLA	COMOROS	HONDURAS	MOZAMBIQUE	SPAIN
ANTIGUA AND BARBUDA	CONGO	HONG KONG	MYANMAR	SRI LANKA
ARGENTINA	COSTA RICA	HUNGARY	NAMIBIA	ST. KITTS AND NEVIS
ARMENIA	COTE D'IVOIRE	ICELAND	NETHERLANDS	ST. LUCIA
ARUBA	CROATIA	INDIA	NETHERLANDS ANTILLES	ST. VINCENT
AUSTRALIA	CUBA	INDONESIA	NEW CALEDONIA	SUDAN
AUSTRIA	CYPRUS	IRAN	NEW ZEALAND	SURINAME
AZERBAIJAN	CZECHOSLOVAKIA	IRELAND	NICARAGUA	SWAZILAND
BAHAMAS	DENMARK	ISLE OF MAN	NIGER	SWEDEN
BAHRAIN	DOMINICA	ISRAEL	NIGERIA	SWITZERLAND
BANGLADESH	DOMINICAN REP.	ITALY	NORWAY	SYRIA
BARBADOS	ECUADOR	JAMAICA	OMAN	THAILAND
BELARUS	EGYPT	JAPAN	PAKISTAN	TOGO
BELGIUM	EL SALVADOR	JORDAN	PANAMA	TONGA
BELIZE	EQUATORIAL GUINEA	KAZAKHSTAN	PARAGUAY	TUNISIA
BENIN	ESTONIA	KENYA	PERU	TURKEY
BERMUDA	ETHIOPIA	KOREA, REPUBLIC OF	PHILIPPINES	TURKMENISTAN
BHUTAN	FAEROE ISLANDS	KUWAIT	POLAND	TURKS AND CAICOS ISL.
BOLIVIA	FIJI	LATVIA	PORTUGAL	TUVALU
BOTSWANA	FINLAND	LEBANON	PUERTO RICO	U.S.A.
BRAZIL	FRANCE	LESOTHO	QATAR	UGANDA
BRUNEI DARUSSALAM	FRENCH POLYNESIA	LIB ARAB JAMAHIRI	ROMANIA	UKRAINE
BULGARIA	GABON	LIBERIA	RUSSIAN FEDERATION	UNITED ARAB EMIRATES
BURKINA FASO	GAMBIA	LUXEMBOURG	RWANDA	UNITED KINGDOM
BURUNDI	GEORGIA	MADAGASCAR	SAN MARINO	UNITED REP. OF TANZANIA
CAMBODIA	GERMANY	MALAWI	SAO TOME AND PRINCIPE	URUGUAY
CAMEROON	GHANA	MALAYSIA	SAUDI ARABIA	VENEZUELA
CANADA	GIBRALTAR	MALDIVES	SENEGAL	VIET NAM
CAPE VERDE	GREECE	MALI	SEYCHELLES	YEMEN
CAYMAN ISLANDS	GRENADA	MALTA	SIERRA LEONE	ZAMBIA
CENTR. AFRICAN REP.	GUAM	MAURITANIA	SINGAPORE	ZIMBABWE

Table A2-2: Overall Herfindahl index for Trinidad and Tobago relative to its 12 Major Trading Partners, 1996-2009 (Full Sample).

Year	USA	Canada	UK	Spain	Jamaica	Barbados	Guyana	Suriname	Dominican Republic	Argentina	Venezuela	Mexico
1996	0.23	0.29	0.33	0.42	0.42	0.12	0.10	0.44	0.21	0.86	0.20	0.47
1997	0.26	0.17	0.40	0.51	0.34	0.12	0.12	0.40	0.22	0.92	0.25	0.55
1998	0.19	0.19	0.40	0.45	0.29	0.20	0.07	0.26	0.24	0.53	0.21	0.35
1999	0.18	0.26	0.26	0.77	0.36	0.26	0.09	0.41	0.31	0.48	0.14	0.32
2000	0.19	0.22	0.43	0.87	0.50	0.38	0.16	0.61	0.37	0.51	0.16	0.30
2001	0.17	0.40	0.44	0.77	0.44	0.30	0.14	0.40	0.37	0.32	0.18	0.31
2002	0.19	0.69	0.37	1.00	0.37	0.27	0.09	0.30	0.43	0.96	0.10	0.45
2003	0.19	0.33	0.48	0.44	0.52	0.37	0.37	0.50	0.29	0.14	0.47	0.23
2004	0.27	0.24	0.42	0.55	0.30	0.24	0.20	0.31	0.37	0.87	0.14	0.24
2005	0.23	0.20	0.35	0.57	0.66	0.41	0.52	0.70	0.50	0.98	0.31	0.22
2006	0.28	0.43	0.52	0.91	0.64	0.65	0.53	0.67	0.39	0.49	0.13	0.24
2007	0.25	0.48	0.35	0.81	0.46	0.40	0.38	0.52	0.61	0.98	0.11	0.33
2008	0.18	0.26	0.37	0.94	0.73	0.66	0.40	0.58	0.68	0.79	0.26	0.42
2009	0.37	0.24	0.77	0.91	0.51	0.50	0.18	0.45	0.52	0.72	0.09	0.34
Average	0.23	0.31	0.42	0.71	0.47	0.35	0.24	0.47	0.39	0.68	0.19	0.34

Notes: The Herfindahl index was computed at the HS 4-digit level of aggregation. Note that in some cases you may have an index of one even if more than one good is exported because figures are reported to two decimal places.

Table A2-3: Overall Herfindahl index for Trinidad and Tobago with respect to Manufactured Goods relative to its 12 Major Trading Partners, 1996-2009.

Year	USA	Canada	UK	Spain	Jamaica	Barbados	Guyana	Suriname	Dominican Republic	Argentina	Venezuela	Mexico
1996	0.65	0.55	0.26		0.11	0.04	0.08	0.10	0.61	0.36	0.60	0.67
1997	0.47	0.75	0.11	0.80	0.12	0.04	0.08	0.09	0.44	0.54	0.76	0.65
1998	0.50	0.59	0.23	0.98	0.15	0.04	0.10	0.09	0.35	0.64	0.69	0.58
1999	0.64	0.47	0.12	0.52	0.09	0.05	0.13	0.16	0.31	0.49	0.42	0.51
2000	0.56	0.43	0.14	0.57	0.09	0.05	0.10	0.16	0.34	0.85	0.38	0.52
2001	0.41	0.67	0.25	0.94	0.12	0.05	0.10	0.14	0.29	0.44	0.45	0.57
2002	0.55	0.78	0.45		0.11	0.05	0.11	0.11	0.34	0.89	0.30	0.51
2003	0.34	0.61	0.26	0.53	0.09	0.05	0.08	0.07	0.38	0.41	0.35	0.41
2004	0.50	0.35	0.09	1.00	0.10	0.07	0.09	0.12	0.42		0.41	0.48
2005	0.31	0.47	0.12	0.97	0.10	0.06	0.08	0.11	0.41	0.13	0.20	0.39
2006	0.29	0.92	0.09	1.00	0.10	0.08	0.08	0.13	0.43	0.99	0.31	0.45
2007	0.33	0.96	0.20	0.98	0.16	0.10	0.09	0.12	0.31	1.00	0.20	0.84
2008	0.37	0.91	0.14	0.66	0.12	0.11	0.09	0.14	0.39	0.51	0.18	0.97
2009	0.09	0.84	0.51	0.33	0.14	0.09	0.15	0.12	0.47	1.00	0.30	0.84
Average	0.43	0.67	0.21	0.77	0.11	0.06	0.10	0.12	0.39	0.63	0.40	0.60

Notes: The Herfindahl index was computed at the HS 4-digit level of aggregation. Note that in some cases you may have an index of one even if more than one good is exported because figures are reported to two decimal places.

Table A2-4: Overall Herfindahl index of Trinidad and Tobago with respect to non-Manufactured Goods relative to its 12 Major Trading Partners, 1996-2009.

Year	USA	Canada	UK	Spain	Jamaica	Barbados	Guyana	Suriname	Dominican Republic	Argentina	Venezuela	Mexico
1996	0.27	0.34	0.35	0.42	0.51	0.23	0.18	0.57	0.31	0.86	0.28	0.38
1997	0.32	0.14	0.42	0.51	0.45	0.23	0.20	0.54	0.34	0.92	0.26	0.52
1998	0.24	0.24	0.46	0.54	0.40	0.36	0.13	0.38	0.37	0.77	0.13	0.41
1999	0.21	0.21	0.27	0.77	0.48	0.44	0.16	0.56	0.48	0.48	0.18	0.23
2000	0.21	0.46	0.44	0.87	0.61	0.53	0.29	0.75	0.48	0.52	0.25	0.54
2001	0.20	0.39	0.46	0.85	0.56	0.38	0.23	0.54	0.44	0.36	0.22	0.64
2002	0.22	0.17	0.42	1.00	0.50	0.44	0.15	0.43	0.60	0.97	0.15	0.71
2003	0.20	0.19	0.52	0.77	0.64	0.49	0.48	0.66	0.63	0.21	0.63	0.52
2004	0.29	0.56	0.42	0.98	0.42	0.33	0.31	0.51	0.60	0.87	0.21	0.47
2005	0.24	0.33	0.35	0.93	0.74	0.49	0.63	0.81	0.68	0.99	0.36	0.41
2006	0.29	0.41	0.53	0.91	0.70	0.77	0.65	0.76	0.67	0.39	0.19	0.48
2007	0.26	0.81	0.36	0.81	0.54	0.55	0.49	0.64	0.70	0.47	0.16	0.50
2008	0.18	0.36	0.39	0.94	0.77	0.77	0.50	0.67	0.75	0.99	0.28	0.59
2009	0.37	0.33	0.79	0.91	0.59	0.62	0.31	0.54	0.58	0.89	0.10	0.40
Average	0.25	0.35	0.44	0.80	0.56	0.47	0.34	0.60	0.54	0.69	0.24	0.49

Notes: The Herfindahl Index was computed at the HS 4-digit level of aggregation. Note that in some cases you may have an index of one even if more than one good is exported because figures are reported to two decimal places.

Table A2-5: Export Markets to which Trinidad and Tobago's Exports had Preferential Access, 1996-2009.

Country	**Name of Agreement**	**Type of Agreement**	**Year Enforced**
Antigua and Barbuda, Barbados, Bahamas, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat ,St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines and Suriname	CARICOM	Reciprocal	1973
Venezuela	CARICOM-Venezuela	Reciprocal	1993
Columbia	CARICOM-Columbia	Reciprocal	1995
Dominican Republic	CARICOM-Dominican Republic	Reciprocal	2001
Cuba	CARICOM-Cuba	Reciprocal	2006
Costa Rica	CARICOM-Costa Rica	Reciprocal	2005
U.S.A.	Caribbean Basin Initiative (CBI)	non-Reciprocal	1984
Canada	CARIBCAN	non-Reciprocal	1986
27 EU Countries	LOME/COTONOU/ EPA	non-Reciprocal	Prior 1996

Note: The Bahamas joined CARICOM in 1983, Suriname joined in 1995 and Haiti joined in 2002. Also, membership in EU became effective for Cyprus, Czechoslovakia, Estonia, Greece, Hungary, Latvia, Malta, Poland, Slovakia and Slovenia in 2004; while that for Bulgaria and Romania became effective in 2007. Lome has been in effect since 1975 (there were four of them, the first signed in 1975). This was replaced by Cotonou in 2000, which was itself replaced by Economic Partnership Agreement (EPA) in 2008.

Table A2-6: Description and Sources of Variables.

Variable Name	Description	Sources
Export	HS 4-digit export data for Trinidad and Tobago, 1996-2009.	Central Statistical Office (CSO), Government of Trinidad and Tobago
LnGDP	Natural log of Gross Domestic Product (constant US$ 2005)	World Development Indicators of the World Bank (2010) and Penn World Tables (PWT 6.3).
LnPopulation	Natural Log of Population Size	World Development Indicators of the World Bank (2010) and Penn World Tables (PWT 6.3).
LnGDPpc	Natural log of Gross Domestic Product per Capita (constant US$ 2005)	Calculated by authors using data from World Development Indicators of the World Bank (2010) and Penn World Tables (PWT 6.3).
CARICOM	Dummy variable equal to 1 if export destination is a member of CARICOM and 0 otherwise.	Administrative Reports of the Ministry of Trade and Industry, Government of Trinidad and Tobago.
NonRecipPref	Dummy variable equal to 1 if Trinidad and Tobago enjoys non-reciprocal preferences in the specific export market and 0 otherwise.	Administrative Reports of the Ministry of Trade and Industry, Government of Trinidad and Tobago.
AvgTariff	Average MFN tariff in export markets.	World Development Indicators of the World Bank 2010 and WITS website.
Governance	Summary Index of Governance (include Voice Accountability, Political Stability, Government Effectiveness, Control of Corruption, Regulatory Quality and Rule of Law. Range in value -2.5 to+2.5.	World Bank (2010) Worldwide Governance Indicators
LnDistance	Natural log of the bilateral distance between Trinidad and Tobago and the respective export destinations.	CEPII (*Centre d'Estudes Prospectives et d'Informations*) website
LnFuelResource	Natural log of fuel share in merchandise exports of the respective export destinations.	World Development Indicators of the World Bank (2010).

Table A2-7: Correlation Matrix of Variables (Full Sample)

	ExSPEC	*LnGDPpc*	*LnPopulation*	*LnGDP*	*LnFuelResource*	*LnDistance*	*Governance*	*AvgTariff*	*CARICOM*	*NonRecipPref*
ExSPEC	1									
LnGDPpc	-0.176	1								
LnPopulation	0.016	-0.143	1							
LnGDP	-0.088	0.457	0.815	1						
LnFuelResource	0.071	0.056	0.265	0.271	1					
LnDistance	0.407	0.053	0.456	0.440	0.121	1				
Governance	-0.140	0.746	-0.239	0.222	-0.222	0.110	1			
AvgTariff	-0.013	-0.567	0.013	-0.320	0.044	-0.256	-0.538	1		
CARICOM	-0.372	-0.035	-0.529	-0.496	-0.152	-0.734	-0.038	0.288	1	
NonRecipPref	-0.009	0.481	0.068	0.343	-0.107	0.119	0.610	-0.460	-0.197	1

Table A2-8: Number of Goods Exported by Trinidad and Tobago, 1996-2009.

Year	Full Sample	Manufactured Goods	% of Manufactured Goods in Total
1996	6537	3230	49
1997	6658	3345	50
1998	6879	3398	49
1999	7008	3413	49
2000	7068	3521	50
2001	7118	3537	50
2002	7147	3495	49
2003	6964	3385	49
2004	6979	3413	49
2005	7479	3613	48
2006	7082	3461	49
2007	7015	3478	50
2008	6748	3125	46
2009	5907	2720	46
Total	**96589**	**47134**	**49**

Note: Goods are defined at the HS 4-digit level of aggregation.

Table A2-9: Number of Goods Exported by Trinidad and Tobago to the 12 Major Trading Partners, 1996-2009 (Full Sample).

Year	USA	Canada	UK	Spain	Jamaica	Barbados	Guyana	Suriname	Dominican Republic	Argentina	Venezuela	Mexico
1996	456	201	196	10	288	475	506	240	80	15	213	34
1997	450	181	193	5	334	502	486	232	69	10	152	10
1998	475	172	192	12	303	505	500	250	90	14	156	34
1999	489	206	193	12	308	518	480	229	88	17	172	22
2000	481	188	154	9	312	551	519	264	94	11	147	20
2001	460	183	173	8	308	545	485	247	97	16	144	28
2002	441	196	171	7	321	526	470	281	80	12	145	28
2003	434	186	196	10	303	524	442	263	93	17	116	25
2004	421	198	185	10	303	515	446	243	94	12	172	23
2005	448	216	174	16	280	523	433	280	78	57	138	44
2006	458	182	167	10	280	512	456	285	70	5	131	31
2007	431	152	160	21	275	529	478	302	78	9	141	30
2008	374	176	152	15	243	483	429	333	88	14	144	42
2009	359	149	120	11	246	441	407	239	56	15	182	38
Total	6177	2586	2426	156	4104	7149	6537	3688	1155	224	2153	409

Notes: Goods represent all products computed at the HS 4-digit level of aggregation.

Table A2-10: Number of Manufactured Goods Exported by Trinidad and Tobago to the 12 Major Export Partners, 1996-2009.

Year	USA	Canada	UK	Spain	Jamaica	Barbados	Guyana	Suriname	Dominican Republic	Argentina	Venezuela	Mexico
1996	208	82	71	0	156	239	245	125	37	4	100	13
1997	204	77	85	2	180	260	241	119	34	2	60	6
1998	216	73	79	6	162	259	247	129	50	4	66	15
1999	227	88	85	3	160	262	235	109	51	3	72	8
2000	210	78	64	2	162	280	259	145	59	4	65	7
2001	207	66	80	3	158	285	248	125	51	5	57	13
2002	189	75	78	0	159	271	231	138	36	3	59	8
2003	207	67	89	2	163	265	215	140	42	5	43	11
2004	186	83	91	3	154	260	232	121	40	0	82	8
2005	198	92	69	7	140	260	220	132	30	27	64	15
2006	212	72	78	1	143	261	224	140	31	2	51	11
2007	192	55	75	11	140	275	256	155	33	2	60	11
2008	158	60	66	3	119	241	199	158	42	6	51	18
2009	149	54	44	4	116	216	181	102	29	5	76	16
Total	2763	1022	1054	47	2112	3634	3233	1838	565	72	906	160

Notes: Number of manufactured goods is computed at the HS 4-digit level of aggregation.

Table A2-11: OLS Estimation Results on the Determinants of Export Specialization (various samples).

VARIABLES	(1) Full Sample equation 2.2 ExSPEC(HHI)	(2) Full Sample equation 2.3 ExSPEC(HHI)	(3) Manufactured goods equation 2.2 ExSPEC(HHI)	(4) Manufactured goods equation 2.3 ExSPEC(HHI)	(5) non-Manufactured goods equation 2.2 ExSPEC(HHI)	(6) non-Manufactured goods equation 2.3 ExSPEC(HHI)
LnGDPpc	-0.241**	-0.0318***	-0.252	0.00959	-0.228**	-0.0286***
	(0.106)	(0.00894)	(0.164)	(0.0197)	(0.0931)	(0.00871)
LnPopulation	-0.331	-0.0629***	-0.448	-0.0310***	-0.0961	-0.0579***
	(0.217)	(0.00523)	(0.339)	(0.00680)	(0.208)	(0.00538)
LnFuelResource	-0.0155	0.0103	0.00695	-0.00212	-0.0178	-0.00329
	(0.0177)	(0.00728)	(0.0222)	(0.00940)	(0.0173)	(0.00720)
AvgTariff	0.00341	0.00234	-0.00540*	-0.00119	0.00332	0.00195
	(0.00214)	(0.00158)	(0.00288)	(0.00194)	(0.00251)	(0.00162)
CARICOM	-0.0331	-0.285***	0.0625	-0.474***	0.0284	-0.230***
	(0.102)	(0.0455)	(0.135)	(0.0531)	(0.0960)	(0.0462)
NonRecipPref	0.0662	0.106***	0.0211	-0.00285	0.125**	0.0807***
	(0.0577)	(0.0256)	(0.117)	(0.0318)	(0.0547)	(0.0250)
Governance	0.0920*	-0.0801***	0.0219	-0.124***	0.0697	-0.0735***
	(0.0511)	(0.0168)	(0.0618)	(0.0265)	(0.0514)	(0.0169)
LnDistance		0.131***		0.0889***		0.118***
		(0.0137)		(0.0147)		(0.0141)
Constant	6.046*	0.768***	11.57*	0.434*	4.259	0.822***
	(3.523)	(0.165)	(6.363)	(.2357)	(2.78)	(.162)
Time fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	No	Yes	No	Yes	No
Observations	872	872	662	662	823	823
R-squared	0.594	0.342	0.661	0.412	0.569	0.294

Notes: Robust standard errors in parentheses and statistical significance is indicated by *** p<0.01, ** p<0.05, * p<0.1.

Table A2-12: Fractional Logit GLM Estimation Results on the Determinants of Export Specialization (various samples with specifications excluding *LnGDPpc*).

	Full Sample		Manufactured Goods		Non-Manufactured Goods	
	(1)	(2)	(3)	(4)	(5)	(6)
	equation 2.2	equation 2.3	equation 2.2	equation 2.3	equation 2.2	equation 2.3
VARIABLES	ExSPEC(HHI)	ExSPEC(HHI)	ExSPEC(HHI)	ExSPEC(HHI)	ExSPEC(HHI)	ExSPEC(HHI)
LnPopulation	-2.395	-0.309***	-3.101	-0.154***	-0.219	-0.298***
	(1.543)	(0.0280)	(2.139)	(0.0380)	(1.515)	(0.0290)
LnFuelResource	-0.0527	0.00560	0.0924	-0.0101	-0.0731	-0.0490
	(0.0967)	(0.0377)	(0.117)	(0.0504)	(0.0936)	(0.0375)
AvgTariff	0.0234*	0.0209**	-0.0351	-0.00839	0.0225	0.0188**
	(0.0128)	(0.00837)	(0.0236)	(0.0112)	(0.0140)	(0.00886)
CARICOM	-0.173	-1.334***	0.274	-2.202***	0.0416	-1.084***
	(0.378)	(0.216)	(0.564)	(0.298)	(0.410)	(0.217)
NonRecipPref	0.565	0.541***	0.00563	0.0477	1.498**	0.440***
	(0.426)	(0.120)	(0.695)	(0.150)	(0.634)	(0.123)
Governance	0.334	-0.548***	0.0621	-0.625***	0.193	-0.524***
	(0.261)	(0.0726)	(0.398)	(0.0965)	(0.249)	(0.0755)
LnDistance		0.652***		0.494***		0.608***
		(0.0667)		(0.0834)		(0.0707)
Constant	36.89	-0.176	46.79	-0.445	5.204	0.248
	(22.95)	(0.650)	(31.86)	(0.860)	(22.57)	(0.665)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	No	Yes	No	Yes	No
Observations	877	877	667	667	827	827

Notes: The Herfindahl index (HHI) is the dependent variable. Robust standard errors in parentheses and statistical significance is indicated by *** p<0.01, ** p<0.05, * p<0.1. GLM was done using family (binomial) link (logit), with robust standard errors.

Table A2-13: Fractional Logit GLM Estimation Results on the Determinants of Export Specialization with count as the dependent variable (various samples with specifications excluding *LnGDPpc*).

	Full Sample		Manufactured Goods		Non-Manufactured Goods	
	(1)	(2)	(3)	(4)	(5)	(6)
	equation 2.2	equation 2.3	equation 2.2	equation 2.3	equation 2.2	equation 2.3
VARIABLES	ExSPEC(Count)	ExSPEC(Count)	ExSPEC(Count)	ExSPEC(Count)	ExSPEC(Count)	ExSPEC(Count)
LnPopulation	0.843***	0.369***	0.608**	0.313***	0.865***	0.361***
	(0.320)	(0.0273)	(0.268)	(0.0279)	(0.322)	(0.0279)
LnFuelResource	-0.00385	-0.201***	-0.0176	-0.186***	-0.00294	-0.199***
	(0.0189)	(0.0337)	(0.0151)	(0.0321)	(0.0190)	(0.0335)
AvgTariff	-0.0129***	-0.00922	-0.0106***	-0.00858	-0.0126***	-0.00858
	(0.00390)	(0.00705)	(0.00345)	(0.00707)	(0.00388)	(0.00709)
CARICOM	0.308**	1.895***	0.310**	1.752***	0.308**	1.867***
	(0.151)	(0.218)	(0.147)	(0.200)	(0.152)	(0.215)
NonRecipPref	-0.502***	0.754***	-0.569**	0.918***	-0.497***	0.766***
	(0.165)	(0.107)	(0.229)	(0.108)	(0.167)	(0.108)
Governance	-0.0124	0.627***	-0.0234	0.527***	-0.0106	0.611***
	(0.0413)	(0.0619)	(0.0396)	(0.0594)	(0.0414)	(0.0620)
LnDistance		-1.090***		-1.015***		-1.077***
		(0.0709)		(0.0666)		(0.0705)
Constant	-11.36**	6.071***	-7.535*	6.507***	-11.65**	6.123***
	(4.772)	(0.694)	(3.990)	(0.651)	(4.803)	(0.689)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	No	Yes	No	Yes	No
Observations	877	877	667	667	827	827

Notes: Robust standard errors in parentheses and statistical significance is indicated by *** p<0.01, ** p<0.05, * p<0.1. GLM was done using family (poisson) link (log), with robust standard errors.

Figure A2-1: Line Graph to Show Total Exports of Trinidad and Tobago, 1996-2009.

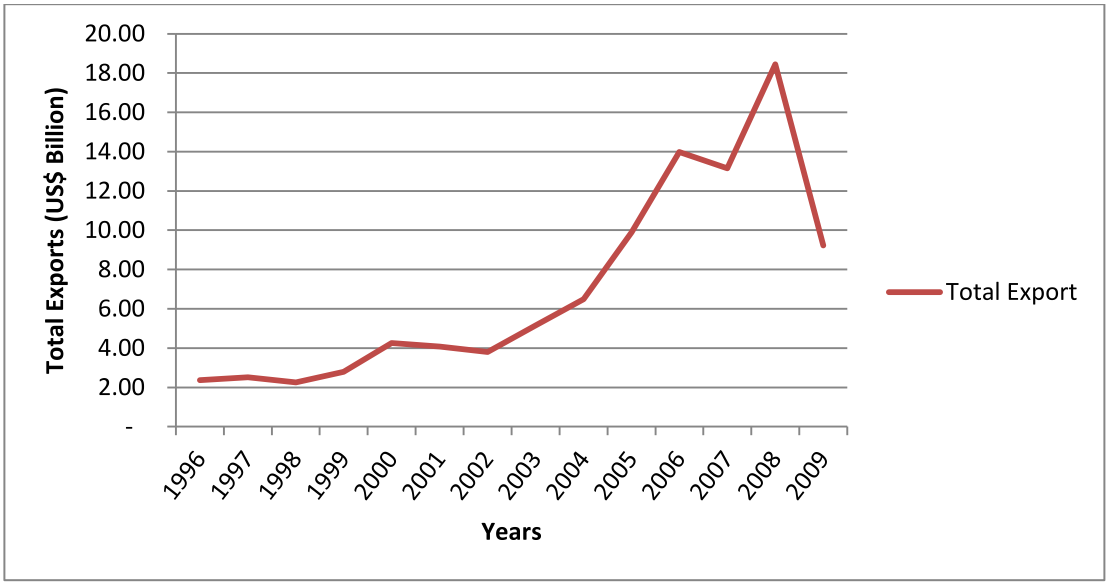


Figure A2-2: Scatter Plot of Export Specialization and log GDP per Capita

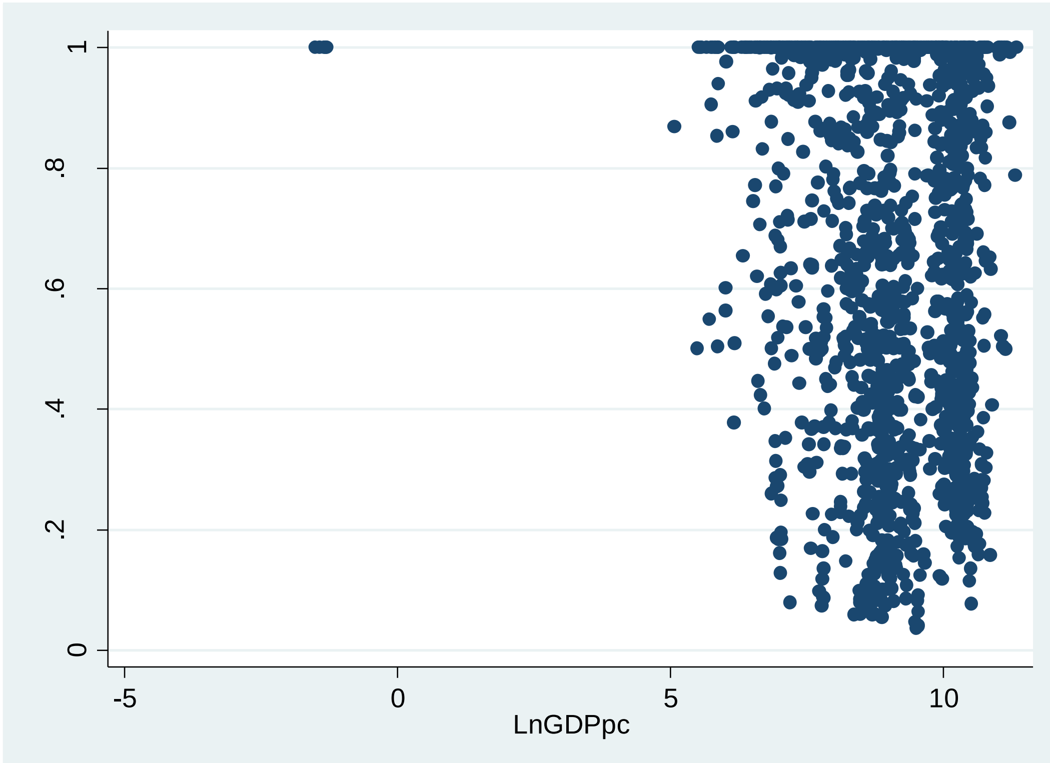


Figure A2-3: Scatter Plot of Export Specialization and log GDP

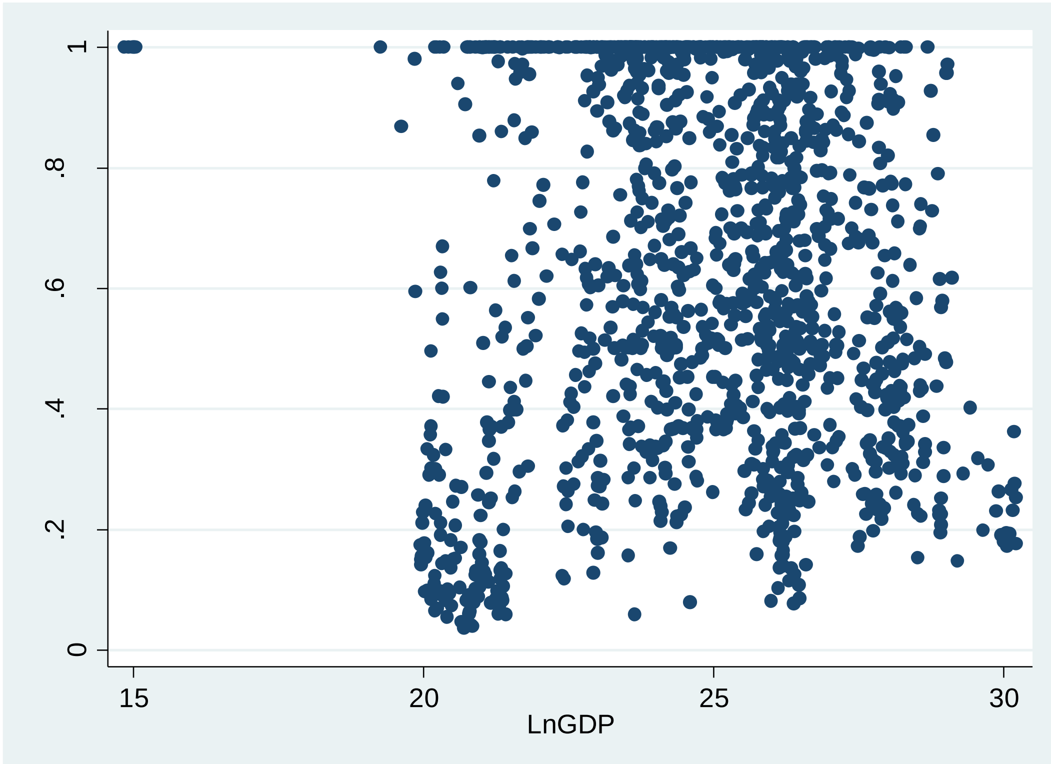


Figure A2-4: Scatter Plot of Export Specialization and log Population

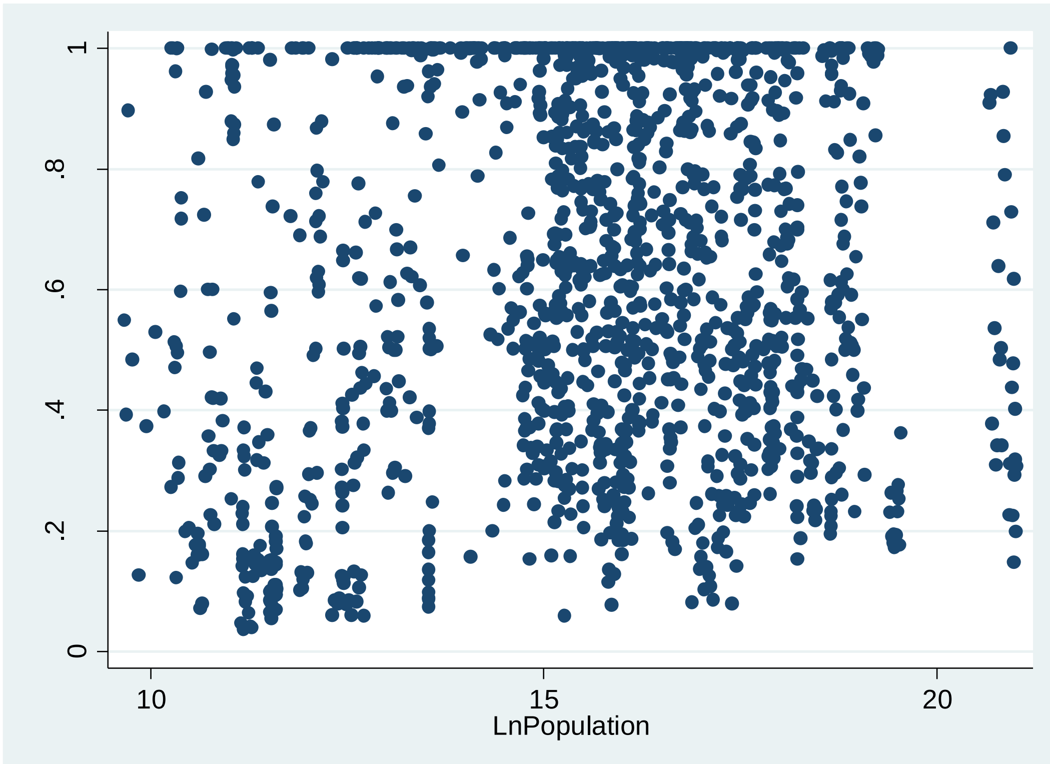


Figure A2-5: Scatter Plot of Export Specialization in log Fuel Share in Merchandise Export (LnFuel Resource)

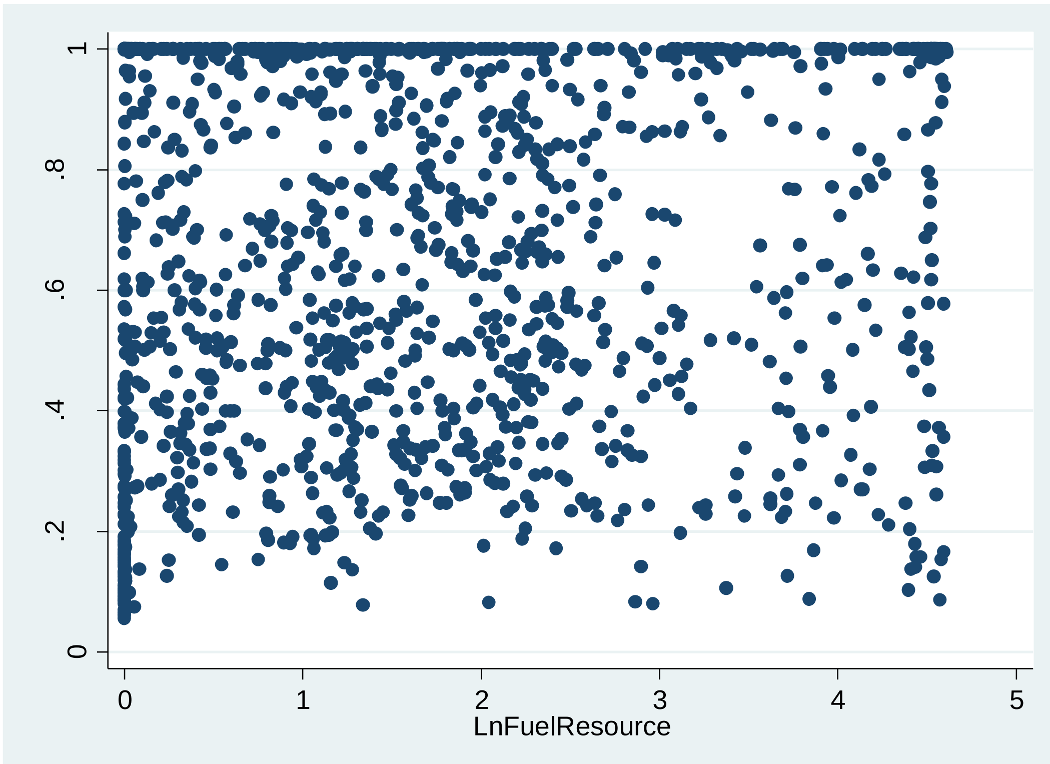


Figure A2-6: Scatter Plot of Export Specialization and log Distance

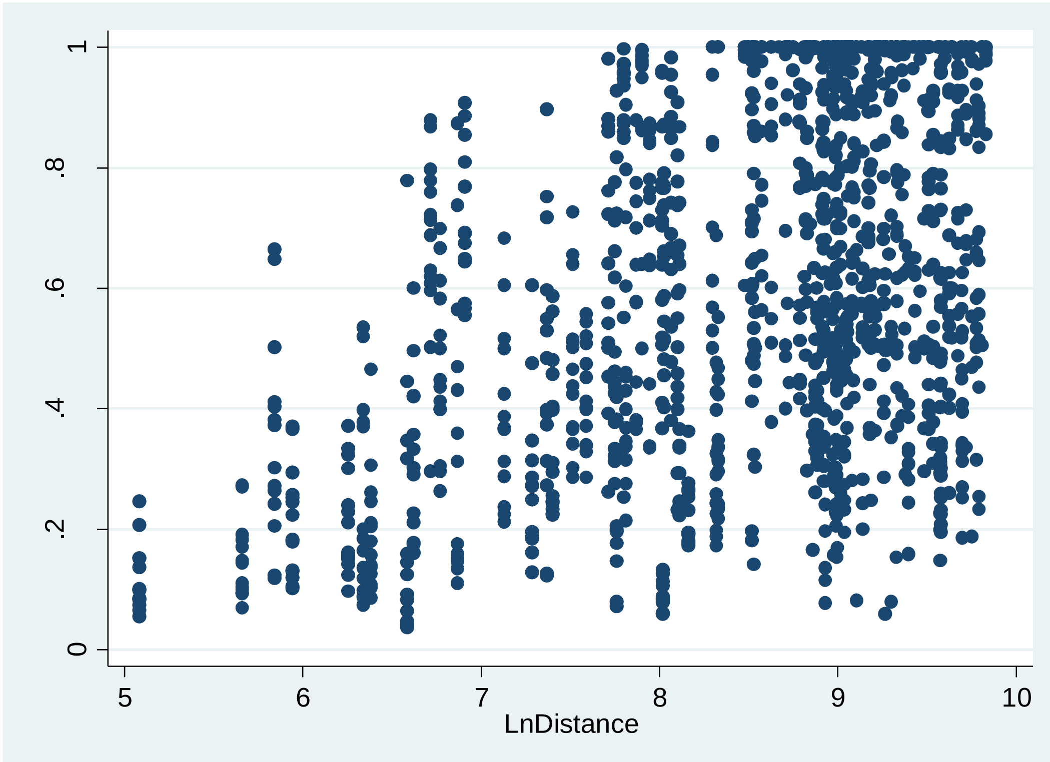


Figure A2-7: Scatter Plot of Export Specialization and Governance

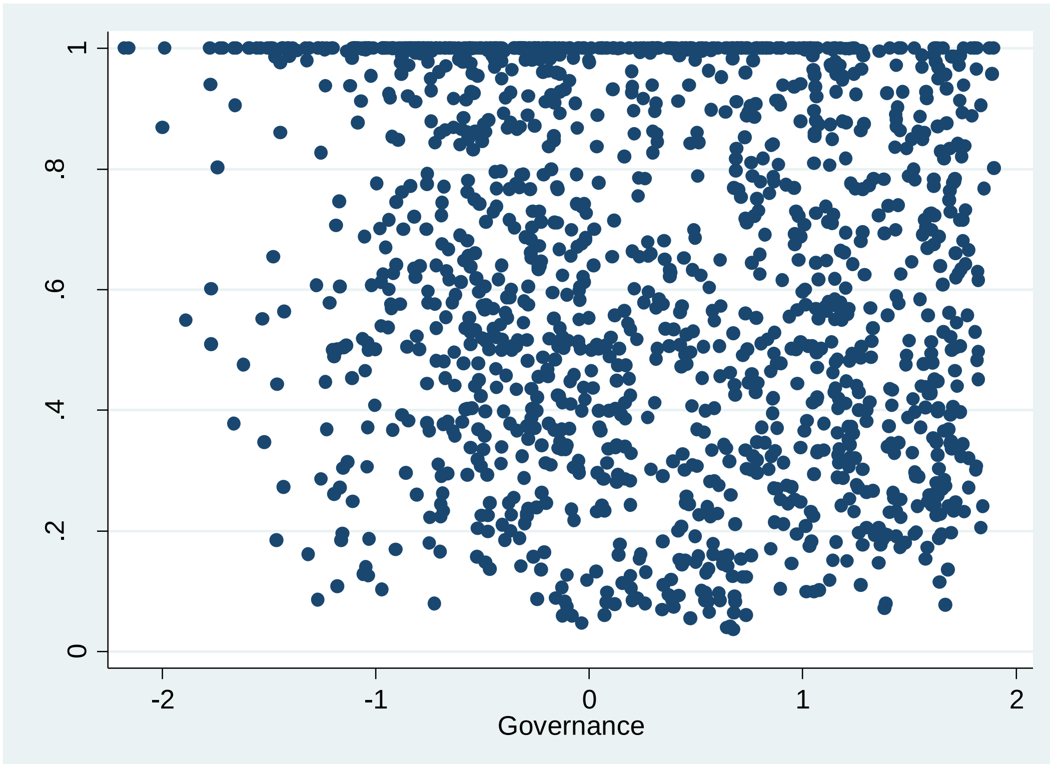
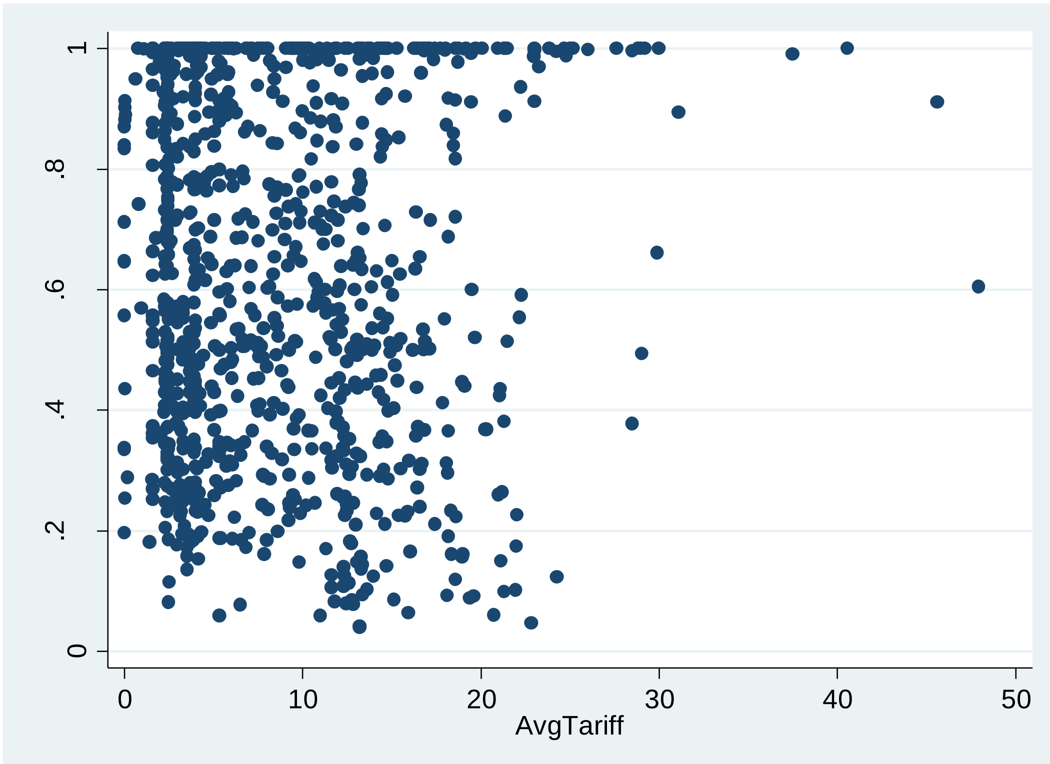


Figure A2-8: Scatter Plot of Export Specialization and Average Tariff.



Chapter 3
The Anatomy of Export Growth in a Small Industrializing Economy: Explaining the Intensive and Extensive Margins

3.1 Introduction

Within recent times, empirical researchers in international trade have devoted considerable attention to studying how exports grow, and examining what factors influence such growth. Notably, exports at the country level can grow in two separate ways. Firstly, countries can export more of the products they are already trading, which is defined in the literature as the intensive margin. And secondly, countries can sell already traded products to new markets, new products to existing markets or new products to new markets; and these components constitute the extensive margin (Amurgo-Pacheco and Pierola, 2007; Brenton and Newfarmer, 2009; Berthelon, 2011). Distinguishing whether exports grow at the intensive or extensive margins and analysing the influence of different factors on both margins are important in many respects. Indeed, there has been a growing recognition that in terms of development, it makes a difference whether exports grow at the intensive or the extensive margin. In this regard, several empirical studies highlight that countries that have been able to expand exports of new products (extensive margin) have performed better in terms of economic development (see Funke and Ruhwedel, 2001; Hausmann et al., 2007; Feenstra and Kee, 2004; Saviotti and Frenken, 2008; Thu, 2010; Karlsson, 2011; Nicita and Klok, 2011). To illustrate, Feenstra and Kee (2004) looking at a number of developed and developing countries over the period 1982-1997, find that countries with greater variety in their exports also have higher productivity. Likewise, in another empirical study, Saviotti and Frenken (2008) looking at 20 OECD countries between 1964 and 2003 find that export variety growth is positively related to their level of economic growth and development. Beyond the links to productivity, growth and development, it has also been shown that trade in more varieties is positively associated with welfare gains. What seems evident from the foregoing is that how exports grow has important implications for economic development.

How exports grow and what influences such growth is also important in terms of trade policy. Indeed, knowledge of trade margins can provide valuable insights into the dynamics of export growth and the effectiveness of trade policy. In this context, information on the quantitative contribution of the intensive and extensive margins to export growth might provide policy makers with a better understanding of the dynamics of export growth and insights into productivity and innovation. In general, export growth at the intensive margin indicates that a country is becoming increasingly specialized in a few commodities; comparatively growth at the extensive margin indicates that the country is exporting goods to more markets and is increasing diversification, an important developmental objective in many countries. Also, knowledge of trade margins can indicate whether countries are making the most of their comparative advantage, and whether firms in particular industries are exploiting economies of scale and becoming more efficient (Liapis, 2009). Moreover, knowledge of trade margins can inform whether policy makers choose to upgrade the quality of existing products, or expand the range of markets in which existing products are sold (geographic diversification). In addition, an understanding of the factors influencing trade margins can assist policy makers to identify appropriate policies to fully exploit intensive and extensive margins. Further, knowledge of trade margins can provide a richer analysis of the benefits or gains from trade liberalization, giving insights on gains that are missing from conventional models (Freenstra and Kee, 2007; Liapis, 2009; Debaere and Moshashari, 2010; Karlsson, 2011). Finally, information on trade margins can guide policy responses in period of economic decline. For instance, in periods of slowing economic growth or declining demand, it may make a difference whether the fall in trade is at the intensive or extensive margin. Indeed, the speed and durability of recovery could depend on which margin is most affected by the crisis. If periods of shrinking demand have relatively higher impact on new export flows (extensive margin), this could imply stronger repercussions for economic growth. If the decline takes place on the intensive margin, trade might bounce back quickly once conditions improve (Haddad et al., 2010; Nicita and Klok, 2011). What seems clear from the foregoing analysis is that an understanding of trade margins could be vital in shedding light on the dynamics of export growth and in guiding the formulation of trade policy. Given that export-led growth is an important developmental objective in many developing countries, knowledge of trade margins and the factors influencing them are of utmost importance.

Notably, the quantitative contributions of the margins of trade to export growth and what influences them have only quite recently received significant attention in the trade literature. Despite the growth of this literature and the importance that an understanding of trade margins offers in terms of development, most of the existing country studies have looked at trade margins from the perspective of developed countries and the larger emerging economies. Importantly, policy conclusions drawn from developed countries and emerging economies may not be appropiate for developing countries (especially small ones). Further, the results of empirical studies looking at the quanitiative contributions of the intensive and extensive margins to export growth have been mixed, with some studies giving a prominent role to expansion along the intensive margin and others emphasizing the extensive margin. Our work therefore seeks to fill a gap in the existing empirical literature by looking at the margins of export growth in a small developing country context. In this regard, this chapter has two primary objectives. First, we seek decompose export growth of Trinidad and Tobago and to assess the quantitative contribution of the intensive and extensive margin to export growth. Second, we seek to examine the role of export destination characteristics (including the nature of their trade policy and institutional attributes) in influencing the intensive and extensive margins of Trinidad and Tobago's exports. We conduct our study using export data for Trinidad and Tobago for the period 1996-2009. Trinidad and Tobago has used a wide range of trade policy instruments to promote economic development, thereby enabling us to look at the impact of a broad range of policy variables on the margins of trade.

The remainder of this chapter is organized as follows. Section 2 reviews and evaluates the relevant theoretical and empirical literature on the intensive and extensive margins of export growth. Section 3 examines the quantitative contributions of the intensive and extensive margins to Trinidad and Tobago's export growth. In this section, we look at the methodology, the data and the results of the decomposition of Trinidad and Tobago's export growth. Section 4 discusses the determinants of trade margins in the context of Trinidad and Tobago. In this section, we present the empirical model specification, the data, the estimation issues and strategy and the results of empirical estimations of the trade margins. The conclusions of the chapter are given in Section 5.

3.2 The Related Literature

3.2.1 The Theoretical Literature

In general, international trade models differ on the type of margins they use to explain changes in the patterns of trade (Bernard et al., 2007). For example, the traditional trade theory models highlight the expansion of existing products (the intensive margins) as the only source of export growth. In these model products are homogenous, there is neither horizontal (attribute) nor vertical (quality) differences in products and export growth is driven by the intensive margin alone (Amiti and Freund, 2007; Berthelon, 2011; Bingzhan, 2011). By contrast, the new trade theory models give a dominant role to the expansion of the number of varieties (the extensive margin) as the primary source of export growth. In these models, there are many kinds of products with horizontal differences and exports can grow with the expansion of product varieties (Amiti and Freund, 2007; Berthelon, 2011; Bingzhan, 2011). More recently, models based on firm heterogeneity have been able to display both types of trade (Berthelon, 2011; Bingzhan, 2011). In line with the standard international trade models, we organize the remainder of our theoretical literature review along the following thematic areas: traditional trade theory models, new trade theory models and heterogeneous firms models.

Traditional Trade Theory Models

Although traditional trade models do not explicitly refer to the concept of the trade margins, these models implicitly assume that trade is driven by the intensive margin. Traditional trade theory explains the flow of goods between countries in terms of comparative advantage (differences in opportunity costs of production). Comparative advantage in these models can arise because of productivity differences ("Ricardian"comparative advantage) or because of a combination of cross-industry differences in factor intensity and cross-country differences in factor abundance ("Heckscher-Ohlin" comparative advantage) (Ricardo, 1817; Heckscher, 1919; Ohlin, 1933). In either case, a key implication of traditional trade theory is that trade is "inter-industry" in nature: that is, countries export one set of industries and import another (Bernard et al., 2007). Thus, in these models, trade is driven by the intensive margin. The absence of a role for the extensive margin in these models is not surprising as firms are assumed to be homogenous.

A notable contribution in line with the perspective of the traditional trade theory models is Armington (1969), who emphasizes the dominant role of the intensive margin in his national differentiation model. This model assumes that each country produces a single variety in each category ($V_j = 1$ for all j, where V is the variety), thus there is no extensive margin. Quality likewise does not vary across countries (Q_j for all j). In this model, a country with more workers or higher productivity simply produces more of each variety, ($x_j = A_j L_j$, where x represent export quantity, A and L represent productivity and employment respectively). Thus, larger economies exports greater value and volume but not greater variety of goods. This intensive margin results in lower prices for each variety. The effect on export prices is smaller, the larger the elasticity of substitution σ between varieties. To illustrate, $p_j = \left(A_j L_j\right)^{\frac{-1}{\sigma}}$. Country $j's$ GDP is $Y_j = p_j x_j V_j = \left(A_j L_j\right)^{1-\frac{1}{\sigma}}$. Taking the logs and rearranging, country $j's$ export quantities and prices can be expressed as:

$$\ln(x_j) = \frac{\sigma}{\sigma - 1}\ln\left(Y_j / L_j\right) + \frac{\sigma}{\sigma - 1}\ln(L_j) \qquad \textbf{3.1}$$

$$\ln\left(p_j\right) = \frac{-1}{\sigma - 1}\ln\left(Y_j / L_j\right) + \frac{-1}{\sigma - 1}\ln(L_j) \qquad \textbf{3.2}$$

In this model, larger economies intensively export higher quantities at lower prices. Acemoglu and Ventura (2002) add endogenous capital accumulation and an endogenous number of varieties to the Armington model. They assume constant returns to capital in the production of each variety and a fixed labour requirement for producing each variety. The number of varieties a country produces is then proportional to its employment $\left(V_j = L_j\right)$. A country with higher productivity produces more of each variety. Higher productivity of each variety translates into lower prices for each variety: $p_j = \left(A_j\right)^{\frac{-1}{\sigma}}$. Country $j's$ GDP is associated with producing higher quantities of each variety and selling them at lower unit prices.

New Trade Theory Models

The new trade theory models give a dominant role to the expansion of the number of varieties (the extensive margin) in trade growth. These models emerged out of the empirical reality that a large share of international trade, was taking place between relatively similar trading partners and within industries (Krugman, 1979, 1980 and 1981; Helpman, 1981; Helpman and Krugman, 1985). In these models, a combination of economies of scale and consumer preferences for variety lead otherwise identical firms to "specialize" in distinct horizontal varieties, spurring two-way or "intra-industry" trade between countries. To illustrate, Krugman (1980) models countries as producing an endogenous number of varieties. With fixed cost of producing each variety, the number of varieties produced in a country is proportional to the size of the economy where ($V_j = Y_j = A_j L_j$, where Y_j is a country's GDP). Following this condition, all countries export the same quantity per variety (i.e. for all j, $x_i = 1$) and export at the same unit prices ($p_j = 1$ for all j). Thus, it necessarily follows that an economy twice the size will produce and export twice the range of goods (also see Helpman and Krugman, 1985). The Krugman model has the property that, conditional on producing a variety, a country exports this variety to all other markets. In this model, the extensive margin increases with the size of the economy but the intensive margin will not. Generally, because there are many kinds of products with horizontal differences, in the new trade theory models, exports can grow with the expansion of product varieties (extensive margin).

Heterogeneous Firms Models

Unlike traditional trade theory and the new trade models, the heterogeneous firm model displays both types of trade. Empirical challenges to old and new trade theory have led to the development of richer theoretical models emphasizing the importance of firm heterogeneity in generating international trade and inducing aggregate productivity growth. Melitz (2003) introduces firm heterogeneity into Krugman's (1981) model of intra-industry trade. In the setup of Melitz (2003), firms try to have large enough sales to make it profitable to cover the sunk costs of entering foreign markets. As a result, the range of firms that export is endogenously determined and related to native firm level-productivity. The profit of a firm located in o selling variety j to destination market d is:

$$\pi_{o,d,j} = \tau_{o,d}^{1-\sigma}\left(\frac{\sigma}{\sigma-1}w_o a_{o,j}\right)^{(1-\sigma)}\frac{B_d}{\sigma} - w_o F_d \tag{3.3}$$

Where $a_{o,j}$ is the amount of labour required to produce 1 unit of variety j and $w_{o,j}$ is the per capita wage, so that $w_o a_{o,j}$ is the marginal cost; $\tau_{o,d}$ is the (iceberg-like) transport cost incurred by the firm in transferring variety j from o to d; σ >1 is the constant elasticity of substitution between varieties; $B_d = \frac{E_d}{E_d^{1-\sigma}}$ is real total expenditure of the consumers of country d; $w_o F_d$ is the fixed cost of entering market d; $\tau_{o,j}^{1-\sigma}\left(\frac{\sigma}{\sigma-1}w_o a_{o,j}\right)^{(1-\sigma)}\frac{B_d}{\sigma}$ represent variable (operating) profit of selling to destination d. The non negative profit condition entails that exporting firms are only those that have marginal costs such that:

$$\pi_{o,d,j} = \tau_{o,d}^{1-\sigma}\left(\frac{\sigma}{\sigma-1}w_o a_{o,j}\right)^{(1-\sigma)}\frac{B_d}{\sigma} - w_o F_d \geq 0 \tag{3.4}$$

The cut off marginal cost $w_o \bar{a}_{o,j}$ is:

$$\tau_{o,d}^{1-\sigma}\left(\frac{\sigma}{\sigma-1}w_o a_{o,j}\right)^{(1-\sigma)}\frac{B_d}{\sigma}=w_o F_d \qquad \textbf{3.5}$$

Given this condition, the value of exports of a firm located in o to destination d is:

$$X_{o,d,j}=\tau_{o,d}^{1-\sigma}\left(\frac{\sigma}{\sigma-1}w_o a_{o,j}\right)^{(1-\sigma)}B_d \Rightarrow a_{o,j}\leq \bar{a}_{o,j} \text{ and } X_{o,d,j}=0 \text{ otherwise} \qquad \textbf{3.6}$$

Equation 3.6 implies a fall in bilateral transport cost, $\tau_{o,d}$ or in fixed entry cost, F_d stimulates bilateral exports. The drop in $\tau_{o,d}$ favours both intensive margin (more foreign sales by incumbent exporters) and extensive margins (more firms can realize variable profits greater than fixed entry cost); a decrease in F_d stimulates only the extensive margin (least efficient firms start exporting because the fixed entry cost has diminished). Since $B_d=\frac{E_d}{E_d^{1-\sigma}}$, it is possible to use GDP of the export destination to proxy for B_d. Thus, GDP of the export destination positively influences both margins. Also, from the setup outlined above, it is straightforward to see how the size of exporters influences both the extensive and intensive margins of trade. First, an increase in the exporter*'s* GDP increases the pool of firms. As some of the new firms are more productive than the most productive current firms, the extensive margin increases. Second, since the consumer values not only having more varieties but also consuming more of each variety, the increase in GDP also changes the intensive margin (Pham and Martin, 2007; Amurgo-Pacheco and Pierola, 2007).

In another important contribution, Chaney (2008) proposes a model of heterogeneous firms (through a random productivity shock based on a Pareto distribution for productivity) with variable and fixed costs of exporting. In his model, like in Melitz, the more productive firms select into exporting delivering an extensive margin of trade.

Chaney derives a bilateral trade gravity model using multiple asymmetric countries and trade barriers where the function $\xi(\sigma)$ affects bilateral export responses to trade barriers:

$$Exports_{ij} = \frac{Cons\tan t * GDP_i * GDP_j}{\left(tradebarriers_{ij}\right)^{\xi(\sigma)}} \qquad \textbf{3.7}$$

In this model, i represents exporter, j represents export destination and σ is the elasticity of substitution between domestic and foreign goods. Chaney's model predicts that the export response to variable trade barriers does not depend on σ :

$$\frac{-\partial \ln\left(Exports_{ij}\right)}{\partial \ln\left(tradebarriers_{ij}\right)} = \gamma \qquad \textbf{3.8}$$

where γ is the shape parameter of the Pareto distribution. However, this model implies that margin responses to changes in variable trade barriers depend on σ . In particular, the response of the extensive margin of trade to variable trade costs is predicted to be amplified for lower σ , and the response of the intensive margin of trade is predicted to be diminished for lower σ . The intuition of this result relates to the fact that in less substitutable sectors (low σ), firms capture a more even market share (as market shares are less responsive to productivity differences for less substitutable sectors). When variable trade barriers decrease, new entrants to the export market in less substitutable sectors will increase the export volume relatively more than in more substitutable sectors, implying a larger response of the extensive margin. In general, in the Chaney model, a reduction in variable trade costs will affect both margins positively, by making each existing exporter export more, and by increasing the number of exporters, since the threshold productivity level will drop. On the other hand, a reduction in fixed trade costs will not affect the intensive margin (the existing exporters have already paid this cost), but it will induce new firms to enter the export market. In other words, it will have a positive effect on the extensive margin.

3.2.2 The Empirical Literature

Quite a substantial empirical literature exists on the quantitative contributions of the intensive and extensive margins to export growth and the factors influencing them. Most of the literature is of fairly recent vintage and emerged due to three three primary factors. First, the increasing availability of disaggregated country-level trade data as well as firm-level export data. Second, advances in the measurement of product variety following the seminal contribution of Feestra (1994). Three, the development of the literature on heterogeneous firms by Melitz (2003) and Chaney (2008). In what follows, we discuss the coverage, model specification and results of previous empirical studies on the intensive and extensive margins.

The Coverage

The table which follows highlights some of the important empirical studies on the trade margins.

Table 3.1: Coverage on the Empirical Literature on Intensive and Extensive Margins of Export Growth

No.	Study	Time Period	Aim of Study	Countries	Type of Analysis	Data type/source	Data Disaggregation	Product categories
1	Hillberry and Mc Daniels (2002)	1993-2001	Decomposition of Export Growth Since NAFTA	United States	Single Country	Customs/ Trade	HS 10-Digit	All Goods
2	Broda and Weinstein (2004)	1972-2001	Contribution of new varieties(extensive margins) to export growth	Exporters to the US	Multi Country	Customs/ Trade	10-digit HTS	All Goods
3	Hummels and Klenow (2005)	1995	Decomposition of Export Growth	126 developed and developing countries	Multi Country	Customs/ trade	HS-6 Digit	All Goods
4	Febermayr and Kohler (2006)	1950-1997	Decomposition and influence on both margins	World Exports	Multi Country	Customs/ Trade	IMF DoTS (NR)	Manufactured Goods
5	Jiang (2007)	1988-2004	Effect of Immigration of the margins	Canada	Single Country	Customs/ Trade	HS-6 Digit	All goods
6	Febermayr and Kohler (2007)	1965-2004	Influence of WTO on extensive margins	104 developed and developing countries	Multi Country	Customs/ Trade	IMF DoTS (NR)	Manufactured Goods
7	Amiti and Freund (2007)	1992-2006	Decomposition of Export Growth only	China	Single	Customs/ Trade	HS 6-digit and 10-digit	All Goods
8	Amurgo-Pacheco and Pierola (2007)	1990-2005	Decomposition and influence on both margins	24 developed and developing countries	Multi Country	Customs/ Trade	HS- 6-digit	All Goods
9	Anderson (2007)	1997-2003	Influence on trade costs on both margins	Sweden	Single	Firm	None	Manufactured Goods
10	Gamberoni (2007)	1994-2005	Influence of unilateral preferences on both margins	118 developing countries	Multi Country	Customs/ Trade	HS-6 Digit	All Goods, agriculture sector and textile sector
11	Ito (2008)	1994-2001	Influence of NAFTA on the Extensive Margins	Mexico	Single Country	Customs/ trade	HS-10 Digit	All Products
12	Luo (2008)	1997-2007	Decomposition and influence on both margins	China	Single Country	Customs/ Trade	HS-4 and 6-digit	All Goods
13	Persson (2008)	2005	Influence of trade facilitation the extensive margin	Developing Countries exports to 25 EU countries	Multi Country	Customs/ Trade	8-digit (Combined Nomenclature)	All Goods
14	De Nardis et al. (2008)	1997-2001	Influence EURO adoption on the both margins	Italy	Single Country	Firm level	ISAE Survey Firm Data	Manufactured Goods
15	Liapis (2009)	1996-2006	Decomposition of Export Growth and the influence on extensive margin	69 developed and developing countries	Multi Country	Customs/ Trade	HS-6 Digit	Agricultural Products

continued

Table 3.1 continued

No.	Study	Time Period	Aim of Study	Countries	Type of Analysis	Data type/source	Data Disaggregation	Product categories
16	Bernasconi (2009)	1995-2004	Influence on the extensive margins only	151 countries	Multi Country	Customs/ Trade	HS6-digit	Manufactured Goods
17	Bernard et al. (2009)	1993-2003	Decomposition of Export Growth	United States	Single Country	Firm	None	All Goods
18	Bensassi et al. (2010)	1995-2008	Effect of Preferential Trade Agreements on The Margins	4 North African Countries	Multi Country	Customs/ trade	SITC 5-Digit	Manufactured Goods
19	Crozet and Koenig (2010)	1986-1992	Influence on the margins	France	Single Country	Firm	None	All Goods
20	Debaere and Mostahhari (2010)	1989-1999	Decomposition and influence of tariffs on extensive margins	177 Exporters to the US	Multi Country	Customs/ Trade	6-digit Harmonized Tariff Schedule (HTS) level	Manufactured Goods
21	Volpe-Martincus et al.(2010a)	1995-2004	Impact of Trade promotion institutions on the Extensive Margin	26 Latin American and Caribbean Countries	Multi Country	Customs/ Trade	HS 6-Digit	All Goods
22	Lawless (2010)	2006	Influence on trade costs on the margins	US	Single Country	Firm	None	All Goods
23	Besedes and Prusa (2011)	1975-2003	Decomposition of Export Growth and the duration of export relationships	48 exporters	Multi Country	Customs/ trade	SITC-4 digit Rev 1	Manufactured Goods
24	Berthelon (2011)	1990-2007	Decomposition of Export Growth only	Chile	Single Country	Customs/ Trade	HS 6-digit	non-copper exports
25	Maeno (2011)	1988-2007	Decomposition and influence on the extensive margin	Japan	Single Country	Customs/ Trade	HS 9-digit	All Goods and manufactured goods only
26	Buono and Lalanne (2012)	1993-2002	Influence of Uruguay Round on the Intensive and Extensive margins	France	Single Country	Firm	3-digit NES level	Manufactured Goods

As shown in Table 3.1 above, most of the empirical studies examining the intensive and extensive margins of export are of fairly recent vintage. Evidently, most studies were published in the decade 2000-2010. Also, studies cover various time periods. While quite a substantial proportion of the studies (for example Hillberry and McDaniels, 2002; and Jiang, 2007) cover short time periods, others such as Febermayr and Kohler (2006 and 2007) and Broada and Weinstein (2004) cover relatively longer time periods.

Empirical researchers looking at the intensive and extensive margins ask a wide array of questions. For example, some researchers such as Hummels and Klenow (2005), Amiti and Freund (2007) and Berthelon (2011) simply ask how exports grow and focus their research exclusively on the decomposition of export growth i.e the quantitative contribution of the margins to growth. The vast majority of studies focus on what factors influence the intensive and extensive margins. Of the studies looking at the factors influencing the intensive and extensive margins, a few in a very general way examine what factors influence the intensive and extensive margins of export growth (for example Liapis, 2009; Maeno, 2011). However, a significant number of studies opt to examine the influence of specific factors on the intensive and extensive margins. For example, some studies look at the role of trade cost reductions (including tariffs and preferences) on the margins. To illustrate, Crozet and Kroenig (2010) and Lawless (2010) use distance as their trade cost measure and examine the impact of trade cost on the trade margins. However, Debaere and Mostahheri (2010) and Buono and Lalanne (2012) use tariff as their trade cost variable and look at the impact of tariffs (in export markets) on the intensive and extensive margins of export growth.[1] Relatedly, some researchers examine the influence of preferences on the margins of export growth (Gamberoni, 2007; Ito, 2008; Benassi et al., 2010).[2] More recently, some studies examine the role of the Foreign Service and other trade promotion institutions on the

[1] Also see Feenstra and Kee (2007) and Moncarz (2010).
[2] Also see Amurgo-Pacheco (2006) and Foster et al. (2011).

margins of trade (Volpe-Martincus et al., 2010a and 2010b).[3] Yet others look at the impact of WTO membership on the trade margins (for example Febermayr and Kohler, 2006 and 2007).[4] Also, a few studies examine the impact of immigration (for example Jiang, 2007) and Euro adoption (for example De Nardis et al., 2008) on the margins of trade growth.[5]

Further, in is evident from Table 3.1 that quite a substantial proportion of the empirical research focuses on the larger industrialised countries and emerging economies. In case where they examine developing countries, the analysis is done on a multi country basis which inevitably masks some of the unique features of developing countries. Also, studies tend to be both single country studies and multi country studies. Examples of single country studies include Amiti and Freund (2007) that looks at China, Berthelon (2011) that looks at Chile and Maeno (2011) that examines the case of Japan. Comparatively, multi country studies include Febermayr and Kohler (2007) and Bernasconi (2009). In addition, although a significant amount of the studies use customs (trade) data, exceptions include Anderson (2007), De Nardis et al. (2008), Bernard et al (2009), Crozet and Koenig (2010) and Lawless (2010) that use firm-level data. Further, studies are done at high levels of data disaggregation. This is not surprising, given that, at high levels of data disaggregation you are better able to observe new varieties so that the calculation of the margins will be more precise. Thus, although a few studies such as Besedes and Prusa (2011) use a 4-digit level of disaggregation, most studies use levels of disaggregation at the 6-digit level or higher. Moreover, most studies tend to look at either all products or focus exclusively on the manufacturing sector.

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[3] Also see Volpe-Martincus and Carballo (2008).
[4] Also see Christodoulopoulou (2010) and Dutt et al. (2011).
[5] There have been some related work by Coughlin and Wall (2011) looking at the role of information networks (ethnic) on the intensive and extensive margins in the case of the United States for the period, 1990-2000.

Previous Approaches to Decomposition and Results

Table A3-1 in the Appendix shows the results of studies looking at the quantitative contribution of the intensive and extensive margins to export growth. From the table it seems evident that, although studies use a variety of decomposition methods, the most popular method seems to be the Amiti and Freund (2007) methodology. Indeed, studies such as Amiti and Freund (2007), Liapis (2009), Berthelon (2011) and Maeno (2011) use the Amiti and Freund methodology. Turning our attention to the quantitative contributions of the two trade margins to export growth, it seems evident that most studies identify the intensive margin as the dominant influence on export growth. To illustrate, Amurgo-Pacheco and Pierola (2007) find, looking at 24 developed and developing economies for the period 1995-2005, that the intensive margin accounts for 86% while the extensive margin accounts for 14% of the overall export growth. Further, they find that the extensive margin is relatively more important in poorer regions than in developed regions. Also, Amiti and Freund (2007), looking at China for the period 1992-2007, find (using 6-digit data), all of China’s export growth (99.8%) occurs at the intensive margin. Comparatively, a few studies identify the extensive margin at the dominant avenue for export growth. For example, Hummels and Klenow (2005) in a study looking at 126 developed and developing countries in the year 1995 find that extensive margin accounts for 60% of exports of the larger economies. Another study which identifies the extensive margin as the primary avenue for export growth is Berthelon (2011). In a study on Chile for period 1990-1999, he finds 54% of the export growth is attributable to the extensive margin. Further, he finds that most of the export growth to countries like Brazil, Ecuador and Mexico occurs on the extensive margin. To illustrate, for trade with Brazil over the period 1990-1999, the extensive margin accounts for 69% of export growth, while in the period 1999-2007, the extensive margin accounts for 77% of export growth. In addition, Bernard et al. (2009) find over the period 1993-2003 that, although most short-run changes in US export growth occur at the intensive margin, most of the long-run changes in exports occur at the extensive margin. Indeed, they find that while the intensive margin accounts for an average of 101% of the year-to-year (short-run) changes in exports, for the period 1993-2003 (long-run), 66% of export growth occurs at the extensive margin.[6]

Previous Empirical Specifications

Table A3-2 in the Appendix shows the model specifications and estimation methods the various empirical studies use in examining the factors influencing the margins of trade. It is evident that most empirical studies use a set of explanatory variables that by and large can be said to belong to the gravity tradition. Although details differ, most studies control for economic size, distance, trading blocs and often some form of trade costs. This is not surprising considering that the same kind of heterogeneous firm trade model that explains the emergence of the extensive and intensive margins of trade can also be used to derive gravity equations (Chaney, 2008 and Helpman et al., 2008). Studies tend to either look at the determinant of both margins or the determinants of the extensive margin only. What is also evident is that studies tend to use the same explanatory variables for modeling both the intensive and extensive margins. Close examination of the table indicates that most studies control for economic size by using either the GDP of importers, GDP of exporters or both. Further, some studies (such as 9, 13, 16 and 22) control for physical size by using population size. Moreover, almost all studies (with the exception of study 10 and 11) use distance as a measure of trade cost. Studies also untilize other traditional gravity variables such as language, colony, border and to a lesser extent remoteness and religion. Moreover, quite a number of studies control for the effect of trade policy. For example, study 4, 6, 10, 12, 16 and 26 include a WTO membership dummy. Also, studies 4, 6, 8, 10, 16, 18 and 21 include Preferential Trade

[6] Also, Kang (2006) using a modification of the Feenstra measure for Korea and Taiwan, for the period 1980-1996, find the extensive margin accounts for most of the export growth in these two countries.

Agreement (PTA) membership dummies. Further, a few studies also incorporate other policy variables such as GSP preferences (10, 20 and 26) and average tariffs (13, 20 and 26). Moreover, in terms of the estimation strategy, although studies use a range of estimation techniques; OLS, Tobit and Probit seem to be the most popular techniques.

Previous Estimation Results

The results of empirical testing on the factors influencing the extensive margin are presented in Table A3-3 in the Appendix. Evidently, most studies report the expected positive relationship between the extensive margin and economic size (GDP). Also, of studies controlling for physical size (using population), most report positive and significant relationships with the extensive margin. A noticeable exception in this regard is study 16 which report a significant, negative relationship. As expected, all studies report significant, negative relationships between the extensive margin and distance. Also, in line with our expectations, most studies including a common language dummy record positive and significant relationships with the extensive margin. A noticeable exception is study 20, which records a negative relationship with significance. Not surprisingly, most studies that include border dummies have positive and significant coefficients. Also, all the studies that include colonial relationship dummy have the expected positive and significant relationship. Moreover, in keeping with expectation, most studies that include WTO, Euro and NAFTA to capture the effect of trade policy record positive and significant relationships. By contrast, studies that include Preferential Trade Agreement (PTA) effect record mixed results. For example, studies 4, 16, 18 and 21 report positive relationships, while studies 6, 8 and 10 record negative relationships. Similarly, the results with respect to average tariff of the importing country are mixed, with studies 20 and 26 reporting negative and significant results and study 13 recording positive and significant results.

Table A3-4 in the Appendix shows the results of empirical testing on the factors influencing the intensive margin. As with the case of the extensive margin, in most cases, studies record the expected positive and significant relationship between economic size (GDP) and the intensive margin. Also, as in the case of the extensive margin, all studies report the expected negative and significant relationships between the intensive margin and distance. Further, almost all the studies using typical gravity variables like language, border and colony report the expected positive and significant relationships with the intensive margin. In addition, with respect to trade policy variables, in line with expectations, the studies using a WTO membership dummy record positive relationships with the intensive margin. Comparatively, the studies using Preferential Trade Agreement (PTA) membership dummies record mixed results being negative in two studies (4, 8 and 10), and positive in one study (18).

3.2.3 Evaluation of the Existing Literature

Despite the increasing popularity of studies looking at the quantitative contributions of the intensive and extensive margins to export growth and the factors influencing these margins, most of the existing studies tend to focus on larger developed countries and the emerging economies (De Nardis et al., 2008). However, studies based on developed countries cannot be used as a suitable blue print for developing countries. Knowledge of trade margins not only could provide valuable insights into the dynamics of export growth, but could inform trade promotion and trade policy formulation. Given that export-led growth and diversification are important developmental objectives in many developing countries, a greater understanding of trade margins from a developing country perspective is of importance. In view of the foregoing issues, we seek to address gaps in the empirical literature by looking at the intensive and extensive margins in a small developing country context.

Using Trinidad and Tobago offers us several other important advantages and allows us to address several deficiencies in the existing literature. The first advantage is that Trinidad and Tobago is a small, open oil based economy and in economies of this nature, tremendous possibilities exist for the occurrence of the Dutch disease or the natural resource curse where gas and oil exports influences the exchange rates to the detriment of the manufacturing sector (Hosein, 2010). Interesting, for most of our study period (1996-2009), there was a significant spike in oil prices and many analysts have referred to this period as a “mini oil boom”.[7] This boom ended in 2007 with the advent of the global financial crisis. Trinidad and Tobago’s exports grew by over 300% from US$ 2.3 billion in 1996 to US$ 9.2 billion in 2009. Thus examining the trade margins in the context of Trinidad and Tobago for the period 1996-2009 is quite interesting because it allows us to look at the behaviour of trade margins in periods of both boom and economic downturn in the context of a hydrocarbon abundant economy. We are thus able to provide new information on the behavior of the trade margins in periods of economic boom and downturn.[8]

The second advantage we derive from using Trinidad and Tobago pertains to the fact that the country has used a wide range of trade policy instruments to promote its industrial development. Thus, we are able to examine the effect of a whole range of trade policy interventions on trade margins thereby addressing some further gaps in the existing literature. To illustrate, Trinidad and Tobago has been a long standing and quite influential member of a customs union (CARICOM) which took significant steps to

[7] This was the second oil boom in the country’s history, the first having occurred in the decade of the 1970s.

[8] Some studies such as Bernard and Jenson (2004) look at the effect of boom on the margins of US export growth and find that, most of the growth in manufacturing exports over the period, 1987-1992, occurs at the intensive margin. A number of other studies look at the effect of economic downturn on the trade margins (see Wakasugi, 2009; Bernard et al., 2009, Haddad et al., 2010; Ando and Kimura, 2010). These studies generally find that most of the declines in exports during financial crisis occur at the intensive margin.

deepen the integration process in the late 1990s and early 2000s.[9] Therefore, Trinidad and Tobago's participation in CARICOM allows us to examine the policy relevant question of whether CARICOM membership matter for both margins of trade thereby assessing whether regional integration is aiding diversification efforts. Undoubtedly, there are a few studies which examine the effect of preferential trade agreements on the margins of trade, notable examples being Febermayr and Kohler (2006, 2007), Amurgo-Pacheco and Pierola (2008) and Bensassi et al. (2010). However, these studies tend to focus on developed countries or are done on a multilateral basis. Thus, by looking at the effect of CARICOM on trade margins, we bring fresh evidence on the impact of preferences from the perspective of a developing country. In addition, Trinidad and Tobago has benefited from a number of non-reciprocal preference schemes with several European countries (Lome/Cotonou/EPA); as well as the USA (Caribbean Basin Initiative) and Canada (CARIBCAN).[10] In the period 1996-2009, there has been some increase in the number of European export markets to which Trinidad and Tobago enjoys these preferences (European enlargement effect). Thus, by examining Trinidad and Tobago, we are able to examine the policy relevant question of whether these non-reciprocal preference schemes matter for the margins of trade thereby assessing whether these preferences help Trinidad and Tobago to diversify or rather lead to it being locked into existing structures.[11] While a few existing studies look at the impact of reciprocal preferences on the margins of trade, the effect of non-reciprocal preferences on the margins of trade is largely ignored in the empirical literature. Exceptions in this regard

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[9] Indeed, in 1992 CARICOM took the decision to implement a on a phased basis a Common External Tariff (CET) within the time frame 1 January 1993 to 1st July 1998. The CET fell from 30-35% to a maximum of 20% between 1993 and 1998. Thus there was deeper integration occurring in our study period. Also, during our study period, Trinidad and Tobago by virtue of being a member of CARICOM benefited from several reciprocal trading arrangements with countries like Venezuela, Columbia, Dominican Republic and Cuba.

[10] Preferential trading relations between EU members and the Caribbean have a long history stretching from previous colonial regimes, though successive rounds of the Lome Convention starting in 1975, to the Cotonou Agreement signed in 2000 and which was itself replaced by the Economic Partnership Agreement (EPA) in 2008. Note that non-reciprocal arrangements are WTO incompatible thus the introduction of EPAs in order to ensure WTO compatibility is more reciprocal in nature.

[11] Authors such as Gamberoni (2007) argue that preference schemes can create incentives to specialize and might actually reduce incentives to diversify. They argue that preferences could contribute to locking in developing countries even more decisively into existing production structures.

include Gamberoni (2007), Debaere and Mostahhari (2010), and Buono and Lalanne (2012). These studies, however, yield mixed results especially as it pertains to the effect of non-reciprocal preferences on the extensive margin. We therefore seek to provide fresh empirical evidence on the impact of non-reciprocal preferences on both margins of trade.

Moreover, Trinidad and Tobago has benefited from tariff reductions in the international export markets over the period. As a member of GATT/WTO, Trinidad and Tobago like many other countries benefited from reductions in tariffs in many international markets accompanying the Uruguay Round. Surprisingly, very few papers in the existing literature explicitly look at the impact of tariff changes on trade margins. Exceptions in this regard include Persson (2008), Debare and Mostahhari (2010) and Buono and Lalanne (2012). Notably, these studies focus on developed countries. We therefore seek to examine a policy relevant issue of whether tariffs matter for the margins of trade. We aim to provide fresh evidence that tariff changes influence both margins of trade from the perspective of a developing country. Relatedly, we seek to provide new evidence on the impact of WTO membership on the margins of trade. Following work by Rose (2004) who looks at the impact of WTO on trade, a few studies look at the impact of WTO membership on trade margins (for example Felbermayr and Kohler, 2007; Christodoulopoulou, 2010; Dutt et al., 2011).[12] However, the effect of WTO membership of trading partners on the margins of trade from a developing country perspective remains an unexplored issue.

A third advantage of looking at Trinidad and Tobago is that it allows us to examine more fully the influence of institutions on the trade margins. For example, we can look at the impact of export promoting organization on trade margins. Trinidad and Tobago

[12] Rose (2004) using a gravity model of 175 countries over 50 years finds little evidence that WTO has a positive effect on trade.

has Diplomatic Missions and Consulates in many countries around the world. These agencies are often involved in trade promotions by addressing information asymmetries between potential sellers and buyers of export products.[13] Rose (2007) looks at the impact of the Foreign Service on trade of 22 countries for the period 2002-2003, and finds the presence of foreign missions positively impact export volume. Following Rose (2007), there are some studies that look at the influence of Embassies and Consulates (economic diplomacy) on trade margins (for example, Volpe-Martincus et al., 2010a and 2010b; Volpe-Martincus and Carballo, 2008 and 2010; Van Biesebroech et al., 2011). However, the geographical coverage of the literature on the impact of economic diplomacy on trade margins is limited and focuses primarily on Latin American countries and to a lesser extent on larger developed countries. Policy conclusions derived from studies looking at these regions may be inappropriate for smaller developing countries. Therefore, we aim to bring fresh evidence by looking at the impact of Embassies and Consulates on trade margins in a different developmental context. In addition, existing studies to a large extent ignore the critical role institutions and governance in export destinations play in influencing the margins of trade. Therefore, we seek to provide fresh evidence on the influence on institutional quality and governance in export destinations on the margins of trade.

[13] Note that, although the core function of Diplomatic Missions and Consulates is not export promotion, many countries establish a commercial desk in these agencies to aid with trade promotion activities.

3.3 Decomposing Export Growth for Trinindad and Tobago into the Intensive and Extensive Margins

3.3.1 Introduction

In this section, we seek to decomopose export growth of Trinidad and Tobago into the intensive and extensive margin. We define the intensive margin as the growth in the export of goods that were already being exported, and the extensive margin as the growth in new export categories (Eaton et al., 2007; Berthelon, 2011; Karlsson, 2011; Amador and Opromolla, 2013). We use Table 3.2 below to clearly illustrate the definitions of the intensive and extensive margins that is utilized in our decomposition of export growth.

Table 3.2: Definitions of the two Margins of Export Growth.

	Old Product	**New Product**	**Drop Product**
Old Destination	(1)	(4)	(5)
New Destination	(2)	(3)	-
Drop Destination	(6)	-	(7)

From Table 3.2 above, the intensive margin consists (1), while the extensive margin is the sum of net product growth (4-5), net destination growth (2-6) and net product-destination growth (3-7).[14] We define the trade margins in this way because it allows us to decompose export growth across a broad range of export destinations therefore capturing the market dimension of export diversification.

[14] This definition is also similar to Brendon and Newfarmer (2007), Bernard et al. (2009) and Bricongne et al. (2011).

3.3.2 Methodology and Data

As we indicated in a previous section, one of the most popular approaches to decompose export growth is the Amiti and Freund methodology. The methodology we use relates closely to the Amiti and Freund methodology but it is modified to include the market dimensions of the trade margin. Therefore, our approach to decomposing export growth offers added information that is not caprured with the Amiti and Freund method. For purposes of exposition, we first discuss the Amiti and Freund method to highlight its major limitation and justify our choice of decomoposion method.

To explain, with the Amiti and Freund methodology, it assumes there are two time periods: the current time period (period *t*) and the past time period (period 0). To follow convention, let V_{ti} be the value of trade at time t in product i ($V_{ti}=p_{ti}q_{ti}$) where p_{ti} represents the price of the product and q_{ti} represent the quantity of the product. I_{to}^{E} is an indicator variable that is equal to one if the product was exported in both period t (current time period) and period 0 (past time period) (existing products). I_{to}^{D} is an indicator variable that is equal to one if the product was exported in period 0 and not in period *t* (disappearing products). I_{to}^{N} is an indicator variable that is equal to one if the product was exported in period t but not in period 0 (new products). Thus, we derive equation 3.9.

$$\underbrace{\frac{\sum_i V_{ti} - \sum_i V_{0i}}{\sum_i V_{0i}}}_{\text{(i)}} = \underbrace{\frac{\sum V_{ti}\left(I_{t0}^{E}\right) - \sum V_{0i}\left(I_{t0}^{E}\right)}{\sum V_{0i}}}_{\text{(ii)}} - \underbrace{\frac{\sum V_{0i}\left(I_{t0}^{D}\right)}{\sum V_{0i}}}_{\text{(iii)}} + \underbrace{\frac{\sum V_{ti}\left(I_{t0}^{N}\right)}{\sum V_{0i}}}_{\text{(iv)}} \qquad \textbf{3.9}$$

This is an identity where total export growth relative to the base period (i) is decomposed into three parts: (ii) the growth in products that were exported in both periods, the intensive margin; (iii) the reduction in export growth due to products no longer exported, disappearing goods; and (iv) the increase in export growth due to the export of new products, the extensive margin. When one divides term (ii) on term (i), the intensive margin is obtained immediately. When one divides terms (iii) and (iv) on term (i) the extensive margin is obtained. Thus, you have the following:

$$IntensiveM\arg in = \frac{\sum V_{ti}\left(I_{t0}^{E}\right) - \sum V_{0i} I_{t0}^{E}}{\sum_i V_{ti} - \sum_i V_{0i}} \tag{3.10}$$

$$ExtensiveM\arg in = \frac{\sum V_{ti}\left(I_{t0}^{N}\right) - \sum V_{0i} I_{t0}^{D}}{\sum_i V_{ti} - \sum_i V_{0i}} \tag{3.11}$$

From the last three equations, the extensive and the intensive margins sum to one for trade with an individual country (export destination) in a given time period. Using Table 3.2, from the perspective of Amiti and Freund, the intensive margin is defined as (1) and the extensive margin is defined as (4-5).

One fundamental disadvantage of using the Amiti and Freund methodology is that you are unable to capture the market dimensions of the trade margins.[15] Another approach to export decomposition closely related to the Amiti and Freund methodology is an approach used by Eaton et al. (2007), Berthelon (2011), Karlsson (2011) and Amador and Opromolla (2013). Equation 3.12 below illustrates this decomposition.

$$\Delta X_t = \Delta V(I^{E}) - V_0(I^{DP} + I^{DD} + I^{DPD}) + V_t(I^{NP} + I^{ND} + I^{NPD}) \tag{3.12}$$

In the above specification, ΔX signifies the change in export value, *V is* the export value, *t* is the current time period and 0 is the past time period. We are thus considering two

[15] This limitation also applies to the Feenstra index of variety.

periods just as we did with the Amiti and Freund methodology. I^{E} is an indicator variable that is equal to one if the product and destination exist in the first period and the second period, existing products and destinations. I^{DP} is an indicator variable that is equal to one if the destination existed in both periods but the product existed only in the first period, drop products. I^{DD} is an indicator variable that is equal to one if the product existed in both the first and second period but the destination appear only in the first period, drop destination. I^{DPD} is an indicator variable that is equal to one if the product and destination exist in the first period but not in the second period, drop product-destination. I^{NP} is an indicator variable that is equal to one if the destination exist in the first and second period but the product exist in the second period and not in the first, new products. I^{ND} is an indicator variable that is equal to one if the product exist in both the first and second period but the destination exist only in the second period. I^{NPD} is an indicator variable that is equal to one if the product and destination do not exist in the first period but exist in the second period, new product-destination. Using these indicators, the concepts of net product growth, net destination growth and net product-destination growth are defined as follows:

$$Net\ Product\ Growth = V_t(I^{NP}) - V_0\ (I^{DP}) \quad \textbf{3.13}$$

$$Net\ Destination\ Growth = V_t(I^{ND}) - V_0(I^{DD}) \quad \textbf{3.14}$$

$$Net\ Product\ Destination\ Growth = V_t(I^{NPD}) - V_0(I^{DPD}) \quad \textbf{3.15}$$

From this perspective and using Table 3.2, the intensive margin consists of (1) and the extensive margin is the sum of net product growth (4-5), net destination growth (2-6) and net product-destination growth (3-7). Our decomposition of export growth is based on this approach because it allows us to adequately capture the market dimensions of the trade margins that cannot be captured using the Amiti and Freund methodology. More specifically, this approach reveals added information on the contribution of new destinations as well as new products and destinations to the extensive margin. This information sheds light on the geographical dimensions of export diversification that cannot be captured using the Amiti and Freund methodology.

In decomoposing export growth into the intensive and extensive margins, the nature of the data one uses is critical. In general, existing empirical studies use highly disaggregated data in their decomposition of the trade margins. The rationale for this is that the trade margins are very sensitive to the level of aggregation of the data one uses, and the level of precision of the decompositions increases the more disaggregated the data one uses. This arises because more disaggregated data allows for better identification of products. Notably, if the level of data disaggregation is not fine enough, many new products may go unobserved and the extensive margin could be under estimated. Another critical issue to consider is the likelihood of measurement errors due reclassification of product codes. Reclassification entails not only splitting a single code into multiple codes, but combining multiple codes into fewer new codes. Reclassifications makes it difficult to tract whether a new code really represents exports of a new product or simply exports of an already existent product under a reclassified code. Export growth from products that are reclassified for any reason will be incorrectly attributed to the extensive margin and thereby overstate the extensive margin (Amiti and Freund, 2007).

In view of the foregoing, we conduct our decompositions using the following data sets: HS 6-digit export data for manufactured goods and non-manufactured goods; and HS 8-digit export data for manufactured goods. Our data sets all cover the period 1996-2009, and contain exports values to approximately 170 export destinations. Thus, our data allows us to match export products with export markets enabling us to calculate the intensive and extensive margins across export markets. However, we are mindful of the fact that our decomposition is product based and thus changes in the classification of products could overstate the extensive margin giving us incorrect results. In view of the fact that the revision in the HS product codes in our dataset occurred in 1999, 2004 and 2007; we conduct our decompositions using the following time horizons to allow for consistent and meaningful results: 1996-1998, 1999-2003, 2004-2006 and 2007-2009.[16] For purposes of comparison, we also look at the whole period, 1996-2009. For our econometric estimations in a subsequent section (to be explained later), we adjust our data using correlation tables available at the World Customs Organization (WCO) website to allow for consistent product codes throughout our various samples thereby minimizing the likelihood of measurement errors.

3.3.3 Results of Decomposition

In this subsection, we present results of the decomposition of Trinidad and Tobago's export growth into the intensive and extensive margins. We look at the contribution of the intensive and extensive margins to Trinidad and Tobago's export growth across a wide range of countries. The results of our decomposition are based on the calculation of the various components of equation 3.12. We look at the decomposition of exports to all export destinations as well as to export destinations classified according to the World Bank income based classification (high, middle and low income countries).

[16] Note that internationally the HS codes were revised in 1996, 2002 and 2007; however the implementation for Trinidad and Tobago occurred 1999, 2004 and 2007, respectively. Thus, for the period 1996-1998 HS 1992 is applicable, for the period 1999-2003 HS 1996 is applicable, for the period 2004-2006 HS 2002 is applicable and for the period 2007-2009 HS 2007 is applicable.

__Decomposition of Export Growth for Whole Period__

Table 3.3 below presents the results of the decomposition of Trinidad and Tobago's export growth to all countries for the entire period, 1996-2009. Greater details of the decomposition are contained in Table A3-5 in the Appendix.

Table 3.3: Decomposition of Trinidad and Tobago's Export Growth to all countries (% share), 1996-2009 (various samples).

Sample	Intensive Margin (%)	Extensive Margin (%)
manufactured goods (HS 6-digit)	7.77	92.23
manufactured goods (HS 8-digit)	5.19	94.81
non-manufactured goods (HS 6-digit)	37.75	62.25

An examination of Table 3.3 highlights three important observations. The first point to note is that across different types of goods and levels of aggregation, the extensive margin dominates export growth. Our results in this regard are not surprising as we expect the extensive margin to be overstated due to changes in the classification of products that took place over the study period. As we indicated earlier, during the study period, there were three rounds of revisions to the HS product codes. In addition, the relatively long time period (14 years) enables more product discovery and the introduction of new export products, hence the relatively high extensive margin (see Karlsson, 2011). Our results are, however, consistent with those of Bernard et al. (2009). For the US over the period 1993-2003 (long-run), they find that 66% of export growth occurs at the extensive margin. The second critical point to note is that the extensive margin is only marginally higher at the HS 8-digit level of aggregation than the HS 6-digit level of aggregation for manufactured goods. Again, our finding here is not unexpected as we anticipate higher levels of disaggregation to allow for better identification of new varieties and give higher values for the extensive margin. The third important point is that the intensive margin is much more important for non-manufactured goods than for manufactured goods. Again, this is not surprising given the nature of the Trinidad and Tobago economy, where a significant component of non-manufactured goods comprises oil and gas and the export prices these products increased substantially over the period in question. Thus, we presume a significant component of the intensive margin changes may be attributable to price changes (largely in the energy sector) and not necessarily volume changes. Further, we examine the composition of the extensive margin for the entire period and present the results in the Table 3.4 below.

Table 3.4: Composition of the Extensive Margin (% share) for various samples.

	manufactured goods HS 6-digit (1996-2009)	**manufactured goods HS 8-digit (1996-2009)**	**non-manufactured goods HS 6-digit (1996-2009)**
% Contribution of New Products to Extensive Margin	59.29	59.31	67.86
% Contribution of New Destination to Extensive Margin	35.92	36.11	31.78
% Contribution of New Product-Destination to Extensive Margin	4.80	4.59	0.36

As shown in Table 3.4, most of the extensive margin changes occur in the new product and new destination components. For example, in the case of manufactured goods, new products contribute about 59% of extensive margin changes and new destinations contribute approximately 36%. Similarly for non-manufactured goods, new products account for 68% of extensive margin changes and new destinations account for 32%.

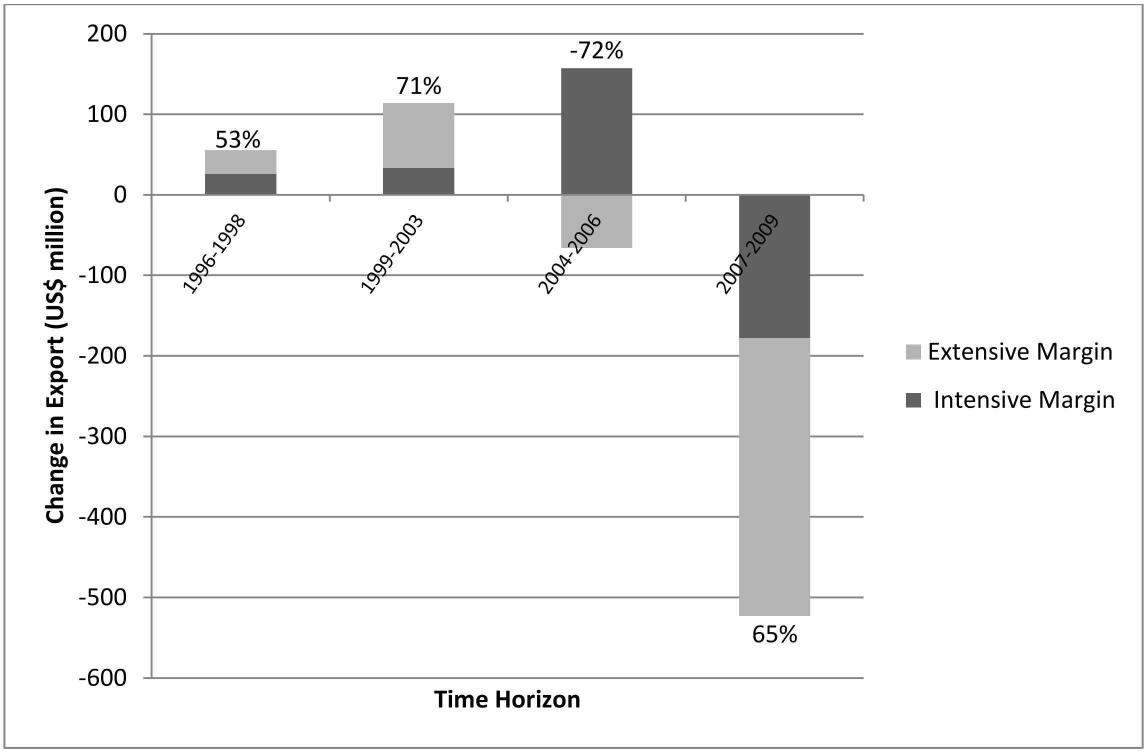
In general, looking at the decomposition of export growth over the entire period suggests that the extensive margin is much more important than the intensive margins. However, given the fact that our results are most likely affected by classification changes, it is more worthwhile to examine the decomposition of exports over periods for which there are no changes in classification.[17] This is what we do for the remainder of this subsection.

Decompositionof Export Growth for Manufactured Goods

The results of the decomposition of Trinidad and Tobago's export growth to all countries for manufactured goods at the HS 6-digit are presented in Figure 3.1 which follows. Greater details of the decomposition are presented in Table A3-5 in the Appendix.

[17] Notably, across all types of goods, the significant contribution of new products does add some credence to our earlier argument that our earlier results may have been partly driven by changes in product classifications.

Figure 3.1: Decomposition of Trinidad and Tobago's Export Growth to all countries for Manufactured Goods (HS 6-digit).



Notes: The numbers at the end of each bar represent the percentage contribution of the extensive margin. The extensive margin and the intensive margins sum to 100%.

It is evident from Figure 3.1 that both in times of economic boom (pre-2007) and periods of economic downturn (post-2007), for manufactured goods, the extensive margin contributes significantly to changes in exports. To illustrate, for the periods 1996-1998 and 1999-2003, the extensive margin contributes more to export growth than the intensive margin. Indeed, for the 1996-1998 and the 1999-2003 periods, the extensive margin contributed approximately 53% and 71% to export growth respectively. Surprisingly, for the 2004-2006 period, while there is a positive change in the intensive margin, the extensive margin is negative. In this regard, while the intensive margin contributes approximately 172% of the growth in exports, the extensive margin reduces growth by approximately 72%. To disentangle the reason for this seemingly strange result we looked at the number of products exported in the various categories and present the results in Table A3-6 in the Appendix. Looking at Table A3-6 together with Table A3-5, it is evident that the decline in the value of new products from $US 69.84 million to $US 20.79 million arose from a decline in the number of new products exported from 2,726 in the period 1999-2003 to 2,503 in period 2004-2006. Similarly, the increase in the value of drop products from $US 23.97 million in the 1999-2003 period to $US 51.27 million in the 2004-2006 period arose despite a fall in the number of drop products from 2976 in the period 1999-2003 to 2,654 in the period 2004-2006. The reason for this maybe that in the 2004-2006 period, the products that were dropped were higher value products. Notably, our findings with respect to the boom period contrast with those of Bernard and Jensen (2004). Looking at United States manufacturing exports over the 1987-1992 boom using firm level data, they find that most of the increases in exports (87%) occur at the intensive margin with the extensive margin accounting for only 13%.

Turning our attention to the period 2007-2009, the period of financial crisis, it is evident from Figure 3.1 that both the intensive and extensive margins contribute to declines in export growth with the extensive margin contributing significantly more. Notably, approximately 65% of the decline in export growth occurs at the extensive margin, while the intensive margin margin accounts for 35%. This finding is not surprising and suggests that the financial crisis had greater impact on the extensive margin than on the intensive margin. Indeed, Nicita and Klok (2011) argue that financial crises tend to have stronger impact on the extensive margin. They advance two basic reasons for this. Firstly, they argue that new exporters may be operating on smaller margins and consequently, these new exporters may be the first to be crowded out once markets shrinks. Secondly, they argue that in times of economic crises, importers may be more willing to rely on proven supplies. Thus, suppliers with limited history may be considered too risky and be the first to experience reduced demand.

However, our results with respect to the financial crisis period, differ from those of Haddad et al. (2010) and Ando and Kimura (2012). To illustrate, Haddad et al. (2010) looking at exports from all exporters to the United States and the European Union (EU) of manufactured goods (HS 6-digit) for the period January 2007-November 2009 (analysis done quarterly), find that 86% of the decline in export growth during the financial crisis to the EU market occurs at the intensive margin. The figure for the United States was even higher (99%). They note that most of the decline in intensive margin is attributed to quantity declines rather than price declines. Also, Ando and Kimura (2012) using a decomposition similar to Haddad et al. (2012), looking at Japan's exports to all countries of selected manufactured goods (machinery parts and components, machinery final goods and automobiles) for the period 2008-2009 (HS 9-digit), find that almost all the declines in exports during this period (financial crisis) occur at the intensive margin. Also, they find quantity changes rather than price changes to be more responsible for the declines in intensive margin.

What seems evident from the foregoing analysis is that, in the case of manufactured goods, both in periods of economic growth and in decline, the extensive margin plays a major role in changes in exports. In periods of financial crisis, the stronger impact on the extensive margin highlights the tremendous vulnerability of the Trinidad and Tobago economy to external events. Our results seem to differ from studies looking at developed countries. Further, we examine the components of the extensive margin and our main results are presented in Table 3.5 which follows.

Table 3.5: Composition of the Extensive Margin (% share) for Manufactured Goods, (HS 6-digit).

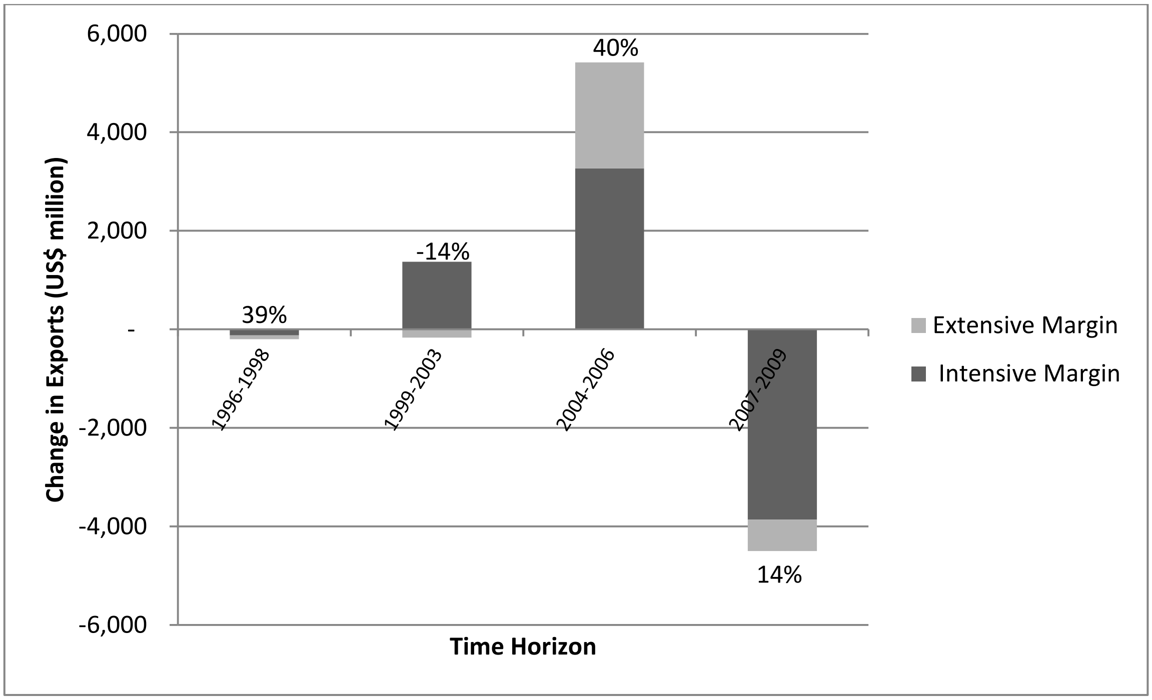
Time horizon	1996-1998	1999-2003	2004-2006	2007-2009
% Contribution of New Products to Extensive Margin	39	57	46	75
% Contribution of New Destination to Extensive Margin	61	40	54	25
% Contribution of New Product-Destination to Extensive Margin	0	3	0	0

Table 3.5 suggests that most of the changes in the extensive margin across time horizons occur in the new product and new destination components. It is also evident that during the financial crisis (2007-2009), 75% of the decline in the extensive margin came from declines in the new product component. Further, we look at the decomposition of export growth for manufactured goods to all countries at the HS 8-digit level of aggregation. The results are presented in Figure A3-1 in the Appendix. What is quite evident is that, the contribution of the margins to export growth at the HS 8-digit level for manufactured goods is quite similar to what obtains at the HS 6-digit level.

Decomposition of Export Growth for non-Manufactured Goods

Turning our attention to non-manufactured goods, the results of our decomposition for non-manufactured goods at the HS 6-digit level of disaggregation are presented in Figure 3.2 below. Greater details of the decomposition are contained in Table A3-5 in the Appendix.

Figure 3.2: Decomposition of Trinidad and Tobago's Export Growth to all countries for non-Manufactured Goods (HS 6-digit).



Note: Numbers at the end of each bar represent percentage contribution of the extensive margin. The extensive and the intensive margins sum to 100%.

It is evident from Figure 3.2 that for non-manufactured goods the intensive margin contributes more to export growth in periods of economic boom and contributes more to declines in export in periods of economic downturn. For example, for the 1999-2003 period, most of the growth in exports (114%) occurs at the intensive margin, while the extensive margin reduces export growth by 14%. Likewise, for the period 2004-2006, most of the growth in exports (60%) occurs at the intensive margin with the extensive margins contributing approximately 40%. Our results here are not surprising given that oil and gas comprise a significant share of non-manufactured goods and the prices of these commodities rose substantially in the period pre-2007. What is also evident from the figure is that during the period of economic downturn (post 2007), the intensive margin contributes more to the decline in export than the extensive margin. In this regard, 86% of the decline in exports occurs at the intensive margin with the extensive margin accounting for approximately 14% of the decline. Again, this is expected given that oil and gas prices declined significantly in this period. This undoubtedly highlights the tremendous vulnerability of the Trinidad and Tobago economy to external economic events. Our results for non-manufactured goods in the period of financial crisis are consistent with Haddad et al. (2010), who find that for non-manufactured goods in the period of financial crisis that most of the declines in exports to both the EU and the United States occur at the intensive margin. Indeed, they find 93% of the exports to the EU and 100% of the decline in the export to the United States during the financial crisis came at the intensive margins. Further, they find that of the intensive margin, price declines rather than quantity declines accounted for most of the decline in exports. Our results are also in line with a study by Wakasugi (2009), where looking at Japanese exports to the United States in the period of the global financial crisis, finds that most of the decline in export occurs at the intensive margin.

Table 3.6: Composition of the Extensive Margin (% share) for non-Manufactured Goods (HS 6-digit).

Time horizon	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**
% Contribution of New Products to Extensive Margin	72	57	45	111
% Contribution of New Destination to Extensive Margin	28	44	55	-11
% Contribution of New Product-Destination to Extensive Margin	0	-1	0	0

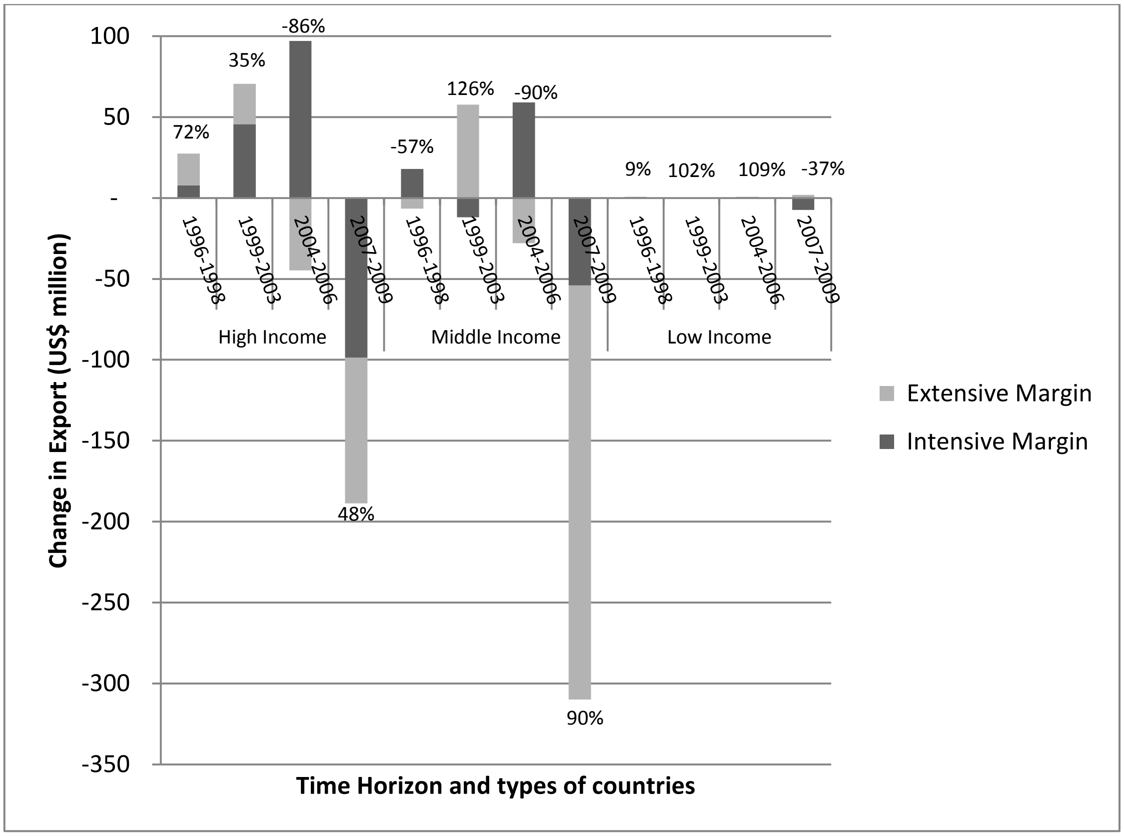
A look at Table 3.6 indicates that, most of the changes to the extensive margin occur in the new product and new destination components. Also, what is quite noticeable is that during the financial crisis (post 2007), 111% of the decline in the extensive margin came from declines in the new product component.

Decomposition of Export Growth by Income Groups (Manufactured Goods)

We also look at the intensive and extensive margins of Trinidad and Tobago's exports across different groups of export destinations, classified on the basis of their incomes. In this context, export destinations are classified according to the World Bank income based classification (high, middle and low income countries).[18] Figure 3.3 below shows the decomposition of Trinidad and Tobago's export growth for manufactured goods at the HS 6-digit level of aggregation to different type of countries. Greater details of the decomposition are presented in Table A3-7 in the Appendix.

[18] Note that countries are classified as high income, middle income and low income on the basis of the World Bank Income classification. World Bank classifies economies according to 2010 GNI per capita, using the Atlas method. With this method, low income countries are those with GNI per capita $1,005 or less; middle income are those in income range $1,006 -$12,275; and high income are those with income $12,276 or more.

Figure 3.3: Decomposition of Trinidad and Tobago's Export Growth to different types of countries for Manufactured Goods (HS6-digit).



Note: Numbers at the end of each bar represent percentage contribution of the extensive margin. The extensive and the intensive margins sum to 100%.

Figure 3.3 shows that most of the export growth in the period of boom occurs in high and middle income country destinations with negligible contributions from low income export destinations. Likewise, most of the decline in export during the period of economic downturn occurs in high and middle income export destinations. What is noticeable is that for high income export destination, with the exception of the 1996-1999 periods, most of the changes in export growth occur at the intensive margin. In the 1996-1998 periods, the extensive margin contributes 72% of export growth, with the intensive margin contributing only 28%. Comparatively, in the 1999-2003 and 2004-

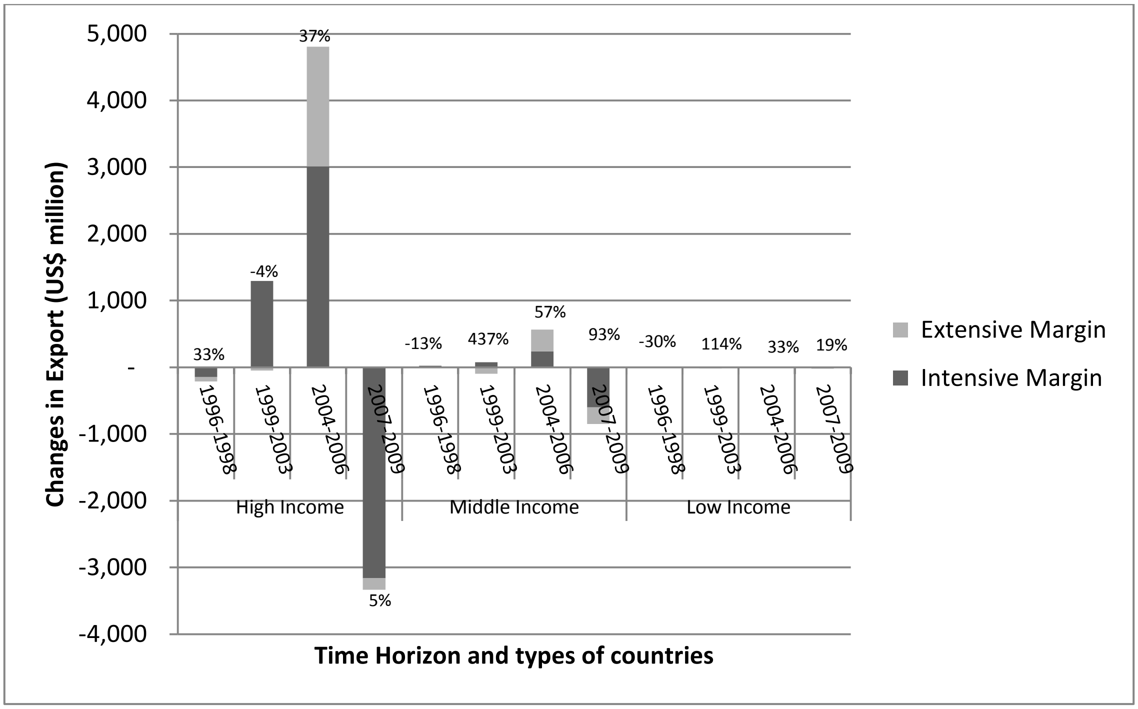
2006 periods, the intensive margin contributes 65% and 186% to export growth, respectively. In the period of financial crisis, the intensive margin contributes 52% of the decline in export growth with the extensive margin accounting for 48%. For middle income export destinations, in the period 1996-1998 and 2004-2006, the intensive margin dominates export growth, whereas in the period 199-2003, it is the extensive margin that dominates export growth. Also, during the period of economic downturn; the extensive margin contributes much more (90%) to the decline than the intensive margin.

Further, we also look at the decomposition at the HS 8-digit level of aggregation for different type of countries and present the results in Figure A3-2 and Table A3-8 in the Appendix. Not surprisingly the pattern seems similar to what obtain at the HS 6-digit level, again suggesting that the share of the intensive and extensive margins to growth does not change much with the level of aggregation as we move from the HS 6-digit level to the HS 8-digit level for manufactured goods.

Decomposition of Export Growth by Income Groups (non-Manufactured Goods)

Turning our attention to non-manufactured goods at the HS 6-digit level, Figure 3.4 below shows the decomposition of Trinidad and Tobago's export growth to different type of export destinations. Greater details of the decomposition are presented in Table A3-9 in the Appendix.

Figure 3.4: Decomposition of Trinidad and Tobago's Export Growth to different types of countries for non-Manufactured Goods (HS6-digit).



Note: Numbers at the end of each bar represent percentage contribution of the extensive margin. The extensive and the intensive margins sum to 100%.

As shown in Figure 3.4 above, it is evident that both in period of boom and economic downturn most of the changes in export occur in high income country destinations with negligible contributions from middle and low income export destinations. With respect to high income export destinations, in periods of economic boom, the intensive margin contributes more to export growth as evident in the periods 1999-2003 and 2004-2006 where the intensive margins contributed 104% and 63% respectively to export growth. Likewise in periods of economic downturn, the intensive margin contributes substantially more to export decline (95%) than the extensive margin. Our results are not surprising and are most likely highly influenced by the behaviour of oil and gas prices.

Summary of Decomposition Results

To summarize, several important findings emanate from our decomposition of Trinidad and Tobago's export growth. First, for manufactured goods both in times of economic boom (pre-2007) and periods of economic downturn (post-2007), the extensive margin contributed significantly to changes in Trinidad and Tobago's exports. Also, most of the changes on the extensive margin emanated from the new product and new destination components. Second, for non-manufactured goods, the intensive margin contributed more to Trinidad and Tobago's export growth in periods of economic boom and contributed more to declines in periods of economic downturn. Further, like we saw in the case of manufactured goods, for non-manufactured goods most of the changes in the extensive margin occurred at the new product and new destination components. Third, for manufactured goods, most of Trinidad and Tobago's export growth occurred in high and middle income export destinations with negligible contribution from low income export destinations. Also, with respect to high income export destinations, in boom periods most of Trinidad and Tobago's export growth occurred at the intensive margin whereas in economic downturn the intensive and the extensive margin contributed almost equally to export declines. For non-manufactured goods, both in periods of boom and periods of economic downturn most of the changes in Trinidad and Tobago's exports occurred in high income countries. Notably, for high income export destinations, the intensive margin contributed more to changes in Trinidad and Tobago's exports in periods of boom and downturn than the extensive margin. In general, while our results for non-manufacured goods seem consistent with existing empirical studies on trade margins, our results with respect to manufactured goods seem to differ. Notably, the decline in export growth in the financial crisis period highlights the tremendous vulnerability of the Trinidad and Tobago economy to external event.

3.4 Determinants of Trinidad and Tobago's Trade Margins

In this section, we seek to examine the role of export destination characteristics (including policy and institutional attributes) in explaining the intensive and extensive margins of Trinidad and Tobago's exports. To do this, we decompose the total value of Trinidad and Tobago's bilateral exports into the intensive and extensive margins, and we specifying an empirical model that emanates from a gravity model of trade. Thereafter, we estimate the model using various estimation techniques.

3.4.1 The Model Specification

To understand the effect of a host of export destination characterstics on the trade margins, in line with the empirical approach adopted by studies such as Volpe-Martincus et al. (2010b) and Bouno and Lalanne (2012), we specify the following model:

$$\begin{aligned} Margin_{jt} &= \beta_0 + \beta_1 \ln GDP_{jt} + \beta_2 CARICOM_{jt} + \beta_3 NonRecipPref_{jt} \\ &+ \beta_4 LnAvgTarif_{jt} + \beta_5 WTO_{jt} + \beta_6 DipMiss_{jt} + \beta_7 Governance_{jt} \\ &+ \beta_8 LnDistance_j + \beta_9 Language_j + \beta_{10} Island_j + \beta_{11} Landlocked_j \\ &+ \beta_{12} Colony_j + \eta_t + \varepsilon_{jt} \end{aligned} \qquad \textbf{3.16}$$

In the above equation, *j* represents the export destination, *t* represents years. The dependent variable is either log number of products LnN_{jt} (the extensive margin) or log average export per product $Ln\left(\frac{X_{jt}}{N_{jt}}\right)$ (the intensive margin).[19] The dependent variables are derived by decomposing the total value of Trinidad and Tobago's bilateral exports

[19] Given the nature of our dataset, we seek to exploit variations in the trade margins across export destinations. This affords us the degrees of freedom to enable meaningful economectic estimations. Notably, our definition of extensive margin does not consider new destinations.

(X_{jt}) into two components parts (the number of products and the export value per product) and taking the logs (see Jiang, 2007; Bernard et al., 2007; Anderson, 2007; Felbermayr and Kohler, 2007; Volpe-Martincus et al., 2010b; Christodoulopoulou, 2010; Dutt et al., 2011). In general, the dependent variables capture export diversity and export intensity. Notably at each period, some goods are disappearing while others are appearing and the count of export goods (N_{jt}) inherently implies the net change. The increase in the number represents a net increase in export diversity. The export value per product $\left(\frac{X_{jt}}{N_{jt}}\right)$ is the matching pair for export intensity. If the export value (nominator) increases faster than export diversity (denominator) expansion, export intensity enhances. The definitions and sources of all the variables in the model are presented in Table A3-10 in the appendix and will be discussed in greater details later. Consistent with the predictions of the standard gravity models, we expect the signs on the coefficients to be as follows: $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 \lessgtr 0$, $\beta_5 > 0$, $\beta_6 > 0$, $\beta_7 > 0$, $\beta_8 < 0$, $\beta_9 > 0$, $\beta_{10} > 0$, $\beta_{11} < 0$ and $\beta_{12} > 0$.

Focusing to our explanatory variables, we capture economic size by the Gross Domestic Product (constant US$ 2005) of the export destinations and this variable is denoted as *(GDP)*. Our apriori expectation is that β_1 will have a positive value, a standard prediction of gravity models. Indeed, the gross domestic product is a measure of purchasing power in the market destinations (capacity to import) and we anticipate that both margins of trade will increase with the *(GDP)* (see Anderson, 2007; Crozet and Koenig, 2010; Lawless, 2010; Foster et al., 2011; Maeno, 2011).[20]

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[20] Some authors such as Jiang (2007) argue that the expected sign on importer GDP could be ambiguous. He argues that rich countries are expected to trade more causing positive effect on the intensive and extensive margins. However, he also noted that rich countries are largely service-oriented, and trade in commodities for those countries could be very small on the intensive and extensive margins.

We capture the effect of preferential trade agreements with the use of two dummy variables. We are mindful of the fact that Trinidad and Tobago exports enjoy two types of preferences in exports markets: reciprocal preferences and non-reciprocal preferences. Reciprocal preferences exist mainly with regard to trade with CARICOM countries as well as other countries such as Venezuela, Costa Rica, Dominican Republic and Cuba; while non-reciprocal preferences exist largely with respect to trade with European and North American countries. To capture the effect of reciprocal preferences we use a dummy variable *(CARICOM),* while we capture non-reciprocal preferences by another dummy variable denoted *(NonRecipPref).* The dummy variable switches on and takes the value of one if Trinidad and Tobago enjoys the particular type of preference in the export market in a particular year and is zero otherwise. Both dummy variables are time varying as they capture the effect of changes in the membership of these preference schemes. Our expectations are that the signs on the coefficients β_2 and β_3 will be positive suggesting that preferences enhance both margins of trade. Indeed, Oguledo and Macphee (1994) argue that preferential trading arrangements engender reductions in barriers to trade, especially artificial ones like tariff and non-tariff barriers. They argue that this in turn will have trade-enhancing effects on trade flows between members of the preferential trading schemes (also see Gamberoni, 2007; Kanda and Jordan, 2010; Foster et al., 2011).

The next explanatory variable measures the average tariff of export destinations and is denoted as *(AvgTariff)*. We proxy average tariff of export destinations with the simple average tariff applied by the export destinations to all other countries. We expect the sign on β_5 to be ambiguous. We know that Trinidad and Tobago export goods to two types of markets: one in which there is preferential access and the other in which there is no preferential market access. In export markets where there is no preferential market access, exports from Trinidad and Tobago are subjected to the average tariff. In this regard, the higher average tariff will have a trade reducing effect. Thus, the expected effect on the trade margins here is negative (see Debaere and Mostashari, 2010; Oguledo and Macphee, 1994). By contrast, in export markets to which Trinidad and Tobago's products enjoy preferential access, the higher the average tariff, the higher the margin of preferences Trinidad and Tobago's exports enjoys, which increases the competitiveness of a greater number of export products from Trinidad and Tobago relative to that from non-preference-receiving third countries. Thus, higher tariff increases trade and the effect on the trade margins is expected to be positive. In general, the influence of tariffs on the trade margins will depend on the relative strength of the two effects, hence the expected sign on β_4 is ambiguous.

Our next independent variable *(WTO)* is a dummy variable capturing the effect of WTO membership of trading partners. One of the fundamental objectives of WTO is to reduce trade barriers and to help the free flow of trade among its members. WTO is also intended to provide common trade rules and improve the enforcement of contract between trade partners. Therefore, WTO is expected to be trade enhancing by reducing uncertainty and trade cost. Thus, our apriori expectation is that WTO membership of trade partners will have a positive effect on both margins implying that the coefficient β_5 will be positive.

The next explanatory variable captures trade promotion (facilitation) by Trinidad and Tobago's Embassies and Consulates located in export destinations. This variable is a dummy variable denoted *(DipMiss)* taking the value 1 if Trinidad and Tobago had an Embassy or Consulate established in the respective export destination in the particular year and 0 otherwise. We know that countries face obstacles in entering export markets, and imperfect information is one of the most prominent of these obstacles. Indeed, economic agents must engage in the costly process of identifying potential exchange partners and assessing their reliability, trustworthiness, timeliness and capabilities. Embassies and Consulates engage in economic diplomacy and facilitate trade by providing market information about the destination and disseminating information about domestic products.[21] They also identify trade opportunities and provide advice on the market potential for specific products (Rose, 2007; Moons, 2012). Thus, it is expected that the presence of Embassies or Consular relationships in export markets will positively affect both trade margins (see Volpe-Martincus et al., 2010a and 2010b). We also expect a larger effect on the extensive margin than on the intensive margin. Our reason for this prediction is that, we expect that the obstacles (imperfect information) will be larger when expanding along the extensive margin (i.e., introducing new goods or adding new countries to the set of destination markets) than along the intensive margin (i.e., increasing exports of already exported goods or to countries that are already among the trading partners). Thus, trade promotion action aimed at reducing the information gaps should have a larger impact on the extensive margin than the intensive margin (Moons, 2012). Therefore, while in both cases β_6 should be positive, it should have a greater magnitude in specifications where the extensive margin is the dependent variable than on equivalent specifications with the intensive margin as the dependent variable.

Our next explanatory variable measures the quality of institutions and governance in the export destinations and is denoted *(Governance)*. We expect the quality of institutions and governance to influence both the opportunities and the cost of trade and consequently influence the opportunities for export. Indeed, “better” institutions imply less uncertainty about contract enforcement and general economic governance, thus less transactions cost and increased trade. Thus, we expect improvements in institutional quality and governance in export destinations to positively influence both the intensive and extensive margins. Therefore, we expect the coefficient β_7 to be positive.

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[21] Economic diplomacy can be defined as the use of government relations and government influence to facilitate cross-border economic activities.

The final group of explanatory variables included in the model captures resistance to trade and are all time invariant. For instance, we include a variable *(Distance)* to capture trade cost. In the standard gravity models, distance is a proxy for transport cost and cultural proximity between two countries. We expect more distant countries to face higher trade cost (export cost, international transport cost and domestic market entry cost) reducing the profitability of exporting new products. Thus, our apriori expectation is that distance will have a negative effect on both margins of trade due to the accumulation of transport cost and other transactions costs (see Amurgo-Pacheco and Pierola, 2007; Jiang, 2007; De Nardis et al., 2008; Persson, 2008; Crozet and Koenig, 2010; Maeno, 2011). We thus expect the sign on β_8 to be negative. The next explanatory variable included in the model captures linguistic similarity between Trinidad and Tobago and the export destinations. We denote this variable as *(Language)*. We know that language affects the ease at which trading relationships can be created. Indeed, knowledge of language in the foreign market reduces communication and information costs. We therefore expect language to positively impact both margins of trade. Thus, the sign on β_9 is expected to be positive (Anderson, 2007; Persson, 2008; Crozet and Koenig, 2010; Lawless, 2010). Our model also includes dummy variables capturing whether the export destination is an island or not *(Island)* and whether the export destination is landlocked or not *(Landlocked)*. As we expect Trinidad and Tobago to do more trade with islands and less trade with landlocked countries, we anticipate the coefficients on β_{10} to be positive and that on β_{11} to be negative (see Anderson, 2007; Rose, 2007).[22] Our final explanatory variable captures whether the export destination and Trinidad and Tobago had a common colonizer and is denoted as *Colony*. We use a dummy variable that is equal to 1 if Trinidad and Tobago and the export destination had a common colonizer. We expect

[22] Anderson (2007) argues that most world trade are shipped via ocean liners and this implies, everything else equal, that the shipment of goods to a landlocked country are associated with higher transport costs than non-landlocked countries.

Trinidad and Tobago to trade more with countries with which it has a common colonial history. Thus, our expectation is that β_{12} will be positive (Persson, 2008; Bastos and Silva, 2008; Crozet and Koenig, 2010).

Also included in the model are η_i that captures time fixed effects. Time fixed effects are included to account for any time specific macroeconomic effects (such as business cycles and oil price shocks) that influence the dependent variables. The final term in the equation (ε), is the error term. Note that later in some of our estimations, we consider alternative specifications were we include either regional fixed effects or country specific fixed effects to account for the influence of unobservable export destination characteristics.

3.4.2 The Data

Data Description and Sources

The data description and sources of the various variables in our model are presented in Table A3-10 in the Appendix. For our estimations, we focus solely on manufactured goods because growth and diversification strategies of many countries tend to focus on manufactured goods (not agriculture, for instance). The dataset we use to construct our dependent variable consists information on the HS 6-digit product code, export value in TT$, export destinations to which products were exported and the year such export occurred. In this context, our data captures bilateral trade flows to more than 170 trading partners for the period, 1996-2009. Thus, our data enables us to exploit variations in intensive and extensive margins both across export destinations and overtime. The list of export destinations in our dataset is found in Table A3-11 in the Appendix.

Importantly, we are mindful that the Harmonized Coding and Description System (Harmonized System or HS) is regularly updated by the World Customs Organization (WCO) to accommodate the emergence of new products and disappearance of previously existing products (see Pierce and Schott, 2012). Indeed amendments to HS product codes occurred in 1992, 1996, 2002 and 2007. Ignoring these amendments increases the risk of overestimating the extensive margin. Fortunately, the WCO provides correlation tables between the latest and the previous versions of HS, which are available at the WCO website.[23] This allow for the conversion of data submitted in a later version of HS to earlier HS versions (and *vice versa*). In our sample period, actual changes in the classification of products occurred 1999, 2004 and 2007. For this reason, to facilitate more accurate adjustment of our product code, we chose to construct two samples for our estimations, namely 1996-2003 and 2004-2009 samples. The significant advantage of splitting the sample the way we did is that, only one rather than multiple product code adjustments is required to construct both subsamples, minimizing the likelihood of data measurement errors. Another fundamental reason why we divided the sample the way we did is because we wanted to separate the financial crisis period from the boom period. Moreover, our samples are based on HS 6-digit data rather than a more disaggregated like (such as HS 8-digit), because more disaggregated data suffers more from changes in product classification.

Focusing on the actual data conversion, for our 1996-2003 sample, we needed to convert from HS 96 to HS 92. Overall there are 5425 product codes (all goods) at the HS 6-digit level and 663 product codes are affected by the change in classification. This means 88% of the product codes are not affected by the classification changes. Because Trinidad and Tobago's manufacturing sector is relatively underdeveloped, for the period 1996-2003, there are 1569 unique product codes in our dataset, however only 63 product codes are affected by classification changes. This implies 95% of the codes in this

[23] See http://www.wcoomd.org/home_hsnomenclature_2012.htm.

sample are unaffected. Likewise, for the 2004-2009 sample, we needed to convert from HS 2007 to HS 2002. Overall there are 5051 HS product codes (for all goods) with 1192 product codes affected by the change in classification, implying that 77% of the codes are affected. For manufactured goods, for the period 2004-2009, in our dataset there are 1678 unique codes with 150 product codes affected by the change in classification, implying 91% of the codes in our sample are unaffected. Using the correlation tables, we adjusted the product codes in both samples to ensure consistency in the product codes in each of the samples.

Turning to our explanatory variables, data for these variables were obtained from various sources as seen in Table A3-10 in the Appendix. For instance, data covering the period 1996-2009 for Gross Domestic Product *(GDP)* (constant US$ 2005) were obtained primarily from the World Development Indicators of the World Bank (2010). In a few cases, we supplement missing data using Penn World Tables (PWT 6.3). We obtained data on preferences (both *CARICOM* and *NonRecipPref*) from the Administrative Reports of the Ministry of Trade and Industry, Government of Trinidad and Tobago. Also, data covering the period 1996-2009 on average (MFN) tariff imposed by export destinations *(AvgTariff)* were obtained the World Development Indicators of the World Bank (2010) and World Integrated Trade Solution **(**WITS) data base. Further, data on WTO membership of export destinations *(WTO)* were sourced from the WTO website. Data on the establishment of Embassies and Consulates by Trinidad and Tobago in export markets *(DipMiss)* were obtained from the Ministry of Foreign Affairs and Communication, Government of Trinidad and Tobago. In addition, data for our institutional quality and governance variable *(Governance)* was obtained from the Worldwide Governance Indicators of the World Bank. This variable was constructed as a composite index of six indicators of institutional quality and includes the following: Voice of Accountability, Political Stability, Governance Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. Notably, each indicator captures some related aspects of the quality of institutions and governance. They either reflect the political process, the quality of the state apparatus and its policies, or the success of governance. The six governance indicators range in values from -2.5 to +2.5 with higher values corresponding to better governance outcomes. To construct the institutional and governance variable, *(Governance)*, we take the simple arithmetic mean of the scores on the six indicators. In addition, data on *Distance, Language, Landlocked* and *Colony* were obtained from CEPII (*Centre d'Estudes Prospectives et d'Informations*) website.[24] And finally, data on *Island* was obtained from the online CIA World Factbook.[25]

Sample Characteristics

The sample characteristics we present in this subsection are all based on our 1996-2003 panel sample. We provide summary statistics of the variables in our model in Table A3-12 in the Appendix. We are mindful of the fact that if our explanatory variables are correlated this could distort our coefficient estimates. To check the correlation between our explanatory variables, we derive correlation matrices (in turn) between our two main dependent variables and our explanatory variables. The results are presented in the Table A3-13 and Table A3-14 in the Appendix. It is evident that a few of our explanatory variables are highly correlated with each other. For example, from Table A3-13, it is evident that *Colony* is highly positively correlated with both *CARICOM* and *Language*. Also, *LnDistance* is highly negatively correlated with *CARICOM* and highly positively correlated with *LnGDP*. Finally, *CARICOM* is strongly negatively correlated with *LnGDP*. Focusing on Table A3-14, the correlation pattern is very similar to what we obtain in Table A3-13.

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[24] Here bilateral Distances (in kilometres) are calculated using the geographic coordinates of the capital cities for both countries. According to CEPII, official or national language is defined to be that spoken by at least 20% of the population. The official language in Trinidad and Tobago is English. *Colony* is defined to include the countries with which Trinidad and Tobago share colonial history.

[25] Available at http://ww.odci.gov/cia/publications/factbook/index.html.

3.4.3 Estimation Issues and Strategy

There are four main estimation issues which we considered to reduce the possibility of bias in our coefficient estimates. The first issue pertains to the high correlation between some of our explanatory variables as presented in our correlation matrices in our preceding subsection. We are mindful of the fact that the high correlation between some of our explanatory variables could create problems of multicollinearity and result in biases and inconsistent coefficient estimates. To address this issue, we estimate some of our regressions where we do not include both collinear variables together. The second estimation issue pertains to the problem of unobserved heterogeneity. In our model specification, we seek to explain the intensive and extensive margins by exploiting variations both across time and across export destinations. Undoubtedly there will be some unobserved export destination characteristics (unobserved heterogeneity) that will influence the intensive and extensive margins that are not captured in our econometric specifications, and ignoring them could distort our coefficient estimates. To minimize concerns of unobserved heterogeneity, in some of our regressions we include regional fixed effects, and in others, we include importer country fixed effects.

The third estimation issue pertains to sample selection-bias arising from the existence of zero trade flows. There are some countries Trinidad and Tobago did not export goods to, thus for these countries, there is zero trade. This is especially the case with small and distant export destinations. Also, there are some trade values that are so small that in the data entry process they may have been rounded to zero. In addition, the existence of zero-valued trade flows could be a result of measurement errors arising from mistakenly recording missing observations as zeros. Irrespective of the reasons for the occurrence of zeros, trade margins are not defined where trade is zero (Dutt et al., 2011; Baier et al., 2011; Bouno and Lallane, 2012). Ignoring zeros creates a methodological challenge, in that, important information on why such low levels of trade occur between Trinidad and

Tobago and certain countries would be omitted leading to biased results. This is so because excluding zero-valued trade flows will place a greater weight both in terms of magnitude and statistical significance on the remaining observations and their corresponding coefficient estimates. For instance, OLS estimation includes observations with positive flows only which means estimates are affected by selection-bias (see Amurgo-Pacheco and Pierola, 2006; Silva and Tenreyo, 2006; Dutt et al., 2011; Bouno and Lallane, 2012). Our 1996-2003 sample contains 39% zero, and our 2004-2009 sample contains 35% zero. To correct for selection-bias, we estimate using Poisson Psuedo Maximum Likelihood (PPML) estimation as suggested by Silva and Tenreyo (2006).[26] This technique provides a natural way to deal with zero-valued trade flows. Our fourth and final estimation issue pertains to potential endogeniety bias, a standard problem of empirical work. Notably, if any of the independent variables are correlated with the error term, the variable is considered to be econometrically "endogenous" and OLS may yield biased and inconsistent estimates. This occurs because one of the fundamental OLS assumptions of zero regressor-error correlation is violated. Potential sources of endogeniety bias of coefficient estimates fall into three categories: omitted variables, simultaneity and measurement error (Baier and Bergstrand, 2007). Very frequently variables capturing the presence or absence of preferences represent a major candidate for endogeniety. Indeed, Baier and Bergstrand (2007) argue that countries establish preferential trading arrangements with countries with which they have considerable trade. In our case, we posit that our preferential trade agreement variables, namely *CARICOM* and *NonRecipPref*, are not endogenous as Trinidad and Tobago is a relatively small player in international trade and it is inconceivable to think policy makers in Trinidad and Tobago had any influence over the decision of other countries to participate in both these schemes (especially as it relates to *NonRecipPref*). However, a possible candidate for endogeniety is our dummy variable *DipMiss*. As Rose (2007) and

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[26] Some studies attempt to treat with this problem using various extensions of the Tobit estimation. However, using this technique presents other methodological challenges.

Segura-Cayuela and Vilarrubia (2008a) indicate, a potential endogeneity problem emerges using the presence of Embassies and Consulates in the export destination as an explanatory variable. The source of this lies in the fact that the decision to set up an Embassy or Consulate might itself be endogenous (also see Martincus et al., 2010a and 2010b). In our case, potential endogeniety arises because government in Trinidad and Tobago may have established Embassies and Consulates in export destinations in which exports (and hence the intensive and extensive margins) are higher.[27] Therefore, we tried to address endogeniety concerns by using an alternative continuous variable to capture trade promotions and estimating using its lagged values.

In general, given the aforementioned econometric issues with which we are confronted, we estimate our regressions using Ordinary Least Squares (OLS) and Poisson Pseudo-Maximum Likelihood (PPML) estimation. We use HS 6-digit manufacturing export data for all our estimations.

3.4.4 Empirical Results

Benchmark Results

For both our 1996-2003 and our 2004-2009 samples, we estimate equation 3.16 by OLS and report our results in the table which follows.

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[27] The direction of causality is therefore from export to *DipMiss* rather than *DipMiss* to export.

Table 3.7: OLS Estimation Results on the Determinants of Trade Margins

	1996-2003			2004-2009		
VARIABLES	(1) Log Total Exports	(2) Log Extensive	(3) Log Intensive	(4) Log Total Exports	(5) Log Extensive	(6) Log Intensive
LnGDP	0.929***	0.387***	0.542***	0.834***	0.354***	0.480***
	(0.0836)	(0.0326)	(0.0736)	(0.0815)	(0.0279)	(0.0763)
CARICOM	4.625***	2.783***	1.842***	3.495***	2.179***	1.316***
	(0.543)	(0.207)	(0.454)	(0.536)	(0.199)	(0.471)
NonRecipPref	1.173***	0.902***	0.270	-0.511	0.219	-0.729*
	(0.444)	(0.177)	(0.395)	(0.429)	(0.168)	(0.380)
LnAvgTariff	-0.383	-0.181**	-0.202	-0.154	-0.0494	-0.105
	(0.273)	(0.0907)	(0.246)	(0.250)	(0.0868)	(0.231)
WTO	0.214	-0.0863	0.300	2.562***	-0.813	3.375***
	(0.772)	(0.278)	(0.625)	(0.445)	(0.620)	(0.878)
DipMiss	-0.494	-0.543***	0.0488	0.320	-0.151	0.470
	(0.349)	(0.115)	(0.311)	(0.319)	(0.113)	(0.292)
Governance	-0.281	0.104	-0.385*	-0.338	0.161**	-0.498***
	(0.238)	(0.0728)	(0.216)	(0.213)	(0.0754)	(0.192)
LnDistance	-2.151***	-1.215***	-0.936***	-1.993***	-1.234***	-0.760***
	(0.153)	(0.0570)	(0.129)	(0.168)	(0.0539)	(0.153)
Language	0.0856	0.502***	-0.417	0.137	0.798***	-0.661**
	(0.383)	(0.120)	(0.341)	(0.338)	(0.124)	(0.305)
Island	1.182***	0.323***	0.859***	0.513	0.108	0.406
	(0.354)	(0.104)	(0.322)	(0.337)	(0.113)	(0.310)
Landlocked	-0.979*	0.125	-1.104**	-1.282**	-0.156	-1.126**
	(0.520)	(0.202)	(0.500)	(0.565)	(0.181)	(0.544)
Constant	6.827***	2.433***	4.394**	6.526***	3.878***	2.648
	(2.458)	(0.862)	(2.172)	(2.381)	(1.001)	(2.367)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	No	No	No	No	No
Observations	487	487	487	453	453	453
R-squared	0.607	0.835	0.267	0.496	0.800	0.236

Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1.

In Table 3.7 above, the dependent variables are the natural log of total exports in column (1) and (4), the natural log of the number of products (extensive margin) in column (2) and (5), and the natural log of the value per product (intensive margin) in column (3) and (6). Since total exports is the sum of the extensive and intensive margins, by the properties of OLS the sum of the coefficients in column (2) and column (3) are equal to the size of the coefficient in column (1) for each explanatory variable. Similarly, the sum of the coefficients in column (5) and column (6) are equal to the size of the coefficient in column (4) for each explanatory variable.[28] In general, we find some interesting results, some of which differ from the empirical findings of previous studies looking looking at the factors explaining the trade margins. For both samples, we find substantial evidence that *GDP* of export destinations have a positive and significant effect on Trinidad and Tobago's exports with stronger positive effect on the intensive than on the extensive margin. These findings seem plausible and suggest that Trinidad and Tobago export a greater number of products and a higher value per product to larger countries where purchasing power is greater. Generally, our results with respect to *LnGDP* are in line with several empirical studies (for example Jiang, 2007; Wakasugi, 2009; Crozet and Koenig, 2010; Bensassi et al., 2010; Lawless, 2010; Buono and Lalanne, 2012). The only difference being that in the latter two studies, the effect is stronger on the extensive margin rather than on the intensive margin. This may be attributed to the fact that in these two studies they look at developed countries, the United States in the case of Lawless (2010) and France in the case of Buono and Lalanne (2012), while our study is done on in the context of a developing country.

Turning our attention to our trade policy variables, several important findings seem evident. For both samples, we find compelling evidence that regional intergration with trade partners through *CARICOM* membership increases Trinidad and Tobago's total exports with a stronger positive effect on the extensive margin than on the intensive margin. Our results in this regard are not surprising and confirm the trade enhancing role of CARICOM. It suggests that CARICOM is indeed contributing to expanding the range of Trinidad and Tobago's exports (export diversification). Our findings in this regard are consistent with work by Ito (2008), who looking at Mexico for the period

[28] This occurs because OLS is a linear operator. Later on in this section when we utilize the Poisson technique, because this is a non-linear model, the sum of the coefficients of the intensive and extensive margins will not be equal to the coefficient on total exports for individual explanatory variables.

1990-2001, finds large increases in the extensive margin of exports from Mexico to the United States after the formation of NAFTA.

Focussing on *NonRecipPref*, for our 1996-2003 sample, we find strong evidence that non-reciprocal preferences have positive and significant effect on both total exports and the extensive margin but have no significant effects on the intensive margin. By contrast, for the 2004-2009 sample, the coefficient on *NonRecipRef* is negative and moderately significant only on the intensive margin. One plausible explanation for the difference in results between 2004-2009 sample and the 1996-2003 sample may be due to the effect of the global financial crisis. Indeed, many of the countries granting non-reciprocal preferences to Trinidad and Tobago are advanced industrial countries whose economies were adversely affected by the global financial crisis in the later sample period.

Looking at our next policy variable, *LnAvgTariff*, for our 1996-2003 sample, we find some evidence that higher average tariffs in export destinations reduces the extensive margin, but do not find any significant effect on total exports and on the intensive margin. By contrast, for our 2004-2009 sample, *LnAvgTariff* is now not significant in any regression, suggesting that tariffs have no effect on total exports, the extensive and intensive margins. Our results with respect to the effect of tariffs differ slightly from those of Buono and Lalanne (2012) who looking at French exports for the period 1993-2002, find robust evidence that higher tariffs reduce the intensive margin but the effect on the extensive margin is less robust.

Looking at *WTO*, for our 1996-2003 sample, our results suggest that WTO membership of export partners do not to matter for total exports as well as the extensive and intensive margins. By contrast, for our 2004-2009 sample, the coefficient on *WTO* is now positive and highly significant for both the total exports and the intensive margin suggesting that the effect of *WTO* membership on exports channels mainly through the intensive margin. What seems evident is that for *WTO*, our results differ from those of a few studies looking at the effect of WTO membership of trade partners on the trade margins. For example, Felbermayr and Kohler (2007) looking at 104 countries over the period 1965-2004, find WTO membership had a positive effect on the extensive margin of exports. Wakasugi (2009), Christodoulopoulou (2010), and Buono and Lalanne (2012) also record similar findings to Felbermayr and Kohler (2007). However, we believe that our results may be attributed to the distinctive nature of our data set. Indeed, close examination of the properties of our data set suggest that a significant portion of Trinidad and Tobago's trading partners (more than 80%) are WTO members and of the non-WTO members, quite a number of the countries are United States and British overseas territories which are geographically close to Trinidad and Tobago and with which Trinidad and Tobago conducts a significant amount of trade.[29]

Turning our attention to our institutional variables, for our 1996-2003 sample, surprisingly we find evidence that the existence of diplomatic representation in export markets *(DipMiss)* has a negative and highly significant impact on the extensive margin, but has no significant effect on the intensive margin and on total exports. By contrast, for the 2004-2009 sample, *DipMiss* is not significant in any regression suggesting that the existence of diplomatic relationship in export destination has no effect on total exports as well as the trade margins. Our results seem contrary to several studies looking at the effect of Diplomatic Missions on exports as well as the export margins.

[29] Among the countries which are Non-WTO members are Puerto Rico, U.S Virgin Islands, British Virgin Islands, Turks and Caicos, Netherland Antilles, Anguilla and Aruba.

Indeed, earlier work by Rose (2007) and Segura-Cayuela and Vilarrubia (2008a) report a positive effect of Diplomatic Missions on exports.[30] In addition, recent work by Volpe-Martincus et al. (2010b) looking at countries from Latin America and the Caribbean over the period 1995-2004, report that the presence of diplomatic representation in export destinations is positive for exports as well as the intensive margin and extensive margins, but with a relatively stronger effect on the extensive margin (also see Volpe-Martincus et al., 2010a). Indeed, we also expected a positive effect of *DipMiss* on both the intensive and extensive margins, with a greater effect on the extensive margin. However, one plausible reason for our result is that quite a number of export destinations where Trinidad and Tobago has a diplomatic presence are the richer industrialised countries and increased competition in these markets makes entry of new products more difficult. With regard to our next institutional variable, *Governance*, for the 1996-2003 sample we find the coefficient on this variable negative and significant only on the intensive margin. By contrast, for the 2004-2009 sample, although *Governance* is still negative and highly significant on the intensive margin, it is also positive and significant on the extensive margin. Ou results therefore suggest that improvement in institutional quality in export destinations is associated with reduction in the intensive margin but the effect on the extensive margin is sensitive to the time period. Our results with respect to the intensive margin are somewhat surprising as we expected better institutional quality and governance in export destinations to be positive for the intensive margin. However, the surprising results may be explained by the fact that export destinations with better institutional quality are the richer industrialised countries that are more self-sufficient and over time will import less of the products they were already importing. Also, greater competition in these markets implies that exporting existing products to these markets could be more difficult over time.

[30] Rose (2007), using data for 22 countries for the period 2002-2003, finds the presence of foreign missions in export markets enhances exports. Segura-Cayuela and Vilarrubia (2008a), using Rose (2007) dataset, confirms this finding.

Looking at our other traditional gravity variables, not surprisingly, for both samples we find strong evidence that *LnDistance* has a negative and significant effect on total exports and on both the intensive and extensive margins. Our results here are quite plausible and suggest that greater distance, increase trade costs and dampen both the number of traded products and the trade per product. Moreover, we observe that the effect of distance channels more though the extensive margin. Our findings in this regard are consistent with those of several in the literature (see Jiang, 2007; Mayer and Ottaviano, 2008; Crozet and Koenig, 2010; Lawless, 2010; Volpe-Martincus et al., 2010b; Dutt et al. 2011; Buono and Lalanne, 2012). Also, for the 1996-2003 sample, *Language* is positive and highly significant for the extensive margin only, but for the 2004-2009 sample, the coefficient on this variable is both positive and highly significant on the extensive margin and negative and significant on the intensive margin. What this suggests is that there is strong evidence that export destinations sharing a common language with Trinidad and Tobago is positive for the extensive margin but the effect on the intensive margin seems to be sensitive to the time period. Our findings with respect to *Language* differ slightly from those of Crozet and Koenig (2010), who find a strong positive effect on both the intensive and extensive margins. Further, for our 1996-2003 sample, we find that Trinidad and Tobago exports more to island countries but the effect channels mainly on the intensive margin than on the extensive margin. By contrast, for the 2004-2009 sample, *Island* has no significant effect on total exports and on the trade margins. Also, for both samples, we observe Trinidad and Tobago export less to landlocked countries and the effect channels on the intensive margin. In this regard, our findings are similar to Anderson (2007) and Jiang (2007) but differ slightly from Bouno and Lalanne (2012), in that, like us they find that exports are less to landlocked countries but unlike us they record negative effects on both margins of trade. Notably, we exclude *Colony* from our benchmark regressions to avoid problems of multicollinearity as this variable is highly correlated with CARICOM. We also try an alternative specification where we include *Colony* and exclude CARICOM from our benchmark regressions.

The results shown in Table A3-16 in the Appendix indicate that our main findings are unaffected by multicollinearity.

We were concerned with whether there were significant differences between our coefficients across regressions in each of the samples in Table 3.7. We therefore considered whether there were any statistically significant differences in the impact of each explanatory variable on the intensive and on the extensive margin for each sample. We thus re-estimate the regressions for both samples as in Table 3.7 (column 2 and 3; and column 5 and 6) using Seemingly Unrelated Regression (SUR) and test for equality of the coefficients across the regressions in each sample. It is evident from our results in Table A3-15 in the Appendix that the null hypothesis of equality of the coefficients across the regressions is rejected for most of our explanatory variables in the both samples. This suggests that most of the explanatory variables in our model have differential impacts (in terms of size) on both margins of trade.

Further, we are mindful of the fact that export destinations characteristics such as factor endowment and openness could influence total exports and the trade margins. We know that ignoring these export destination effects could distort our coefficient estimates and compromise our results. Therefore, we seek to control for export destination effects by including regional fixed effects in our model. We use six regional dummies representing the six continents, namely: Africa, Europe, Asia, North America, South America and Oceania. These dummies take the value of 1 if the export partner country is contained in the specific continent and 0 otherwise. We control for fixed effects in this way because this approach allows us to estimate time invariant terms in the model that gets swept away by using country specific fixed effects. The results of our fixed effect model are shown in the table which follows.

Table 3.8: Results of Fixed Effect Model on the Determinants of Trade Margins using regional dummies.

	1996-2003			2004-2009		
VARIABLES	(1) Log Total Exports	(2) Log Extensive	(3) Log Intensive	(4) Log Total Exports	(5) Log Extensive	(6) Log Intensive
LnGDP	0.909***	0.398***	0.512***	0.829***	0.358***	0.471***
	(0.0896)	(0.0350)	(0.0821)	(0.0857)	(0.0301)	(0.0813)
CARICOM	5.616***	2.896***	2.720***	4.535***	2.180***	2.355***
	(0.576)	(0.222)	(0.484)	(0.541)	(0.239)	(0.446)
NonRecipPref	1.618***	0.861***	0.757*	-0.174	0.0329	-0.207
	(0.522)	(0.220)	(0.453)	(0.528)	(0.220)	(0.465)
LnAvgTariff	-0.201	-0.130	-0.0717	0.0518	0.0202	0.0316
	(0.296)	(0.0998)	(0.258)	(0.258)	(0.0929)	(0.232)
WTO	0.328	-0.0514	0.380	2.654***	-0.798	3.452***
	(0.744)	(0.273)	(0.595)	(0.431)	(0.665)	(0.810)
DipMiss	-0.809**	-0.667***	-0.142	0.322	-0.0567	0.378
	(0.394)	(0.141)	(0.342)	(0.352)	(0.138)	(0.333)
Governance	-0.196	0.118	-0.314	-0.0502	0.162**	-0.212
	(0.257)	(0.0775)	(0.231)	(0.223)	(0.0795)	(0.200)
LnDistance	-1.475***	-1.004***	-0.471***	-1.397***	-1.101***	-0.296
	(0.217)	(0.0854)	(0.167)	(0.216)	(0.0830)	(0.207)
Language	-0.123	0.569***	-0.692*	-0.211	0.838***	-1.050***
	(0.406)	(0.137)	(0.376)	(0.364)	(0.149)	(0.335)
Island	1.673***	0.419***	1.254***	0.785*	-0.0469	0.832**
	(0.396)	(0.141)	(0.374)	(0.421)	(0.140)	(0.397)
Landlocked	-0.605	0.209	-0.814	-0.776	-0.148	-0.628
	(0.525)	(0.204)	(0.503)	(0.560)	(0.184)	(0.537)
Africa	-0.691	-0.502**	-0.189	-0.393	-0.717***	0.323
	(0.763)	(0.227)	(0.687)	(0.753)	(0.244)	(0.732)
Europe	-0.696	-0.246	-0.450	-1.477**	-0.397	-1.080*
	(0.684)	(0.243)	(0.587)	(0.719)	(0.273)	(0.627)
Asia	-0.639	-0.472**	-0.167	-0.562	-0.561**	-0.000507
	(0.695)	(0.238)	(0.580)	(0.680)	(0.233)	(0.636)
North America	1.940***	0.258	1.682***	2.237***	-0.0221	2.259***
	(0.539)	(0.188)	(0.477)	(0.584)	(0.214)	(0.543)
South America	0.599	-0.0457	0.645	-0.704	-0.662***	-0.0424
	(0.498)	(0.184)	(0.437)	(0.629)	(0.247)	(0.569)
Oceania	-1.216	-1.022***	-0.194	-3.457***	-0.669*	-2.789**
	(0.984)	(0.311)	(0.894)	(1.228)	(0.358)	(1.106)
Constant	0.914	0.404	0.510	1.176	2.919**	-1.743
	(2.685)	(1.092)	(2.304)	(2.584)	(1.178)	(2.536)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Regional Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	487	487	487	453	453	453
R-squared	0.638	0.842	0.312	0.564	0.810	0.326

Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1.

As shown in Table 3.8 above, when we control for regional fixed effects, our results from the two samples are both consistent with each other and with our previous results. Our results thus seem robust to the inclusion of regional fixed effects. For both time periods, it is evident that most of the coefficients maintain their signs and significance. However, there are a few minor differences we wish to mention. With respect to our 1996-2003 sample, *NonRecipPref* is now positive and moderately significant on the intensive margin, *DipMiss* is now negative and significant on total exports and *Language* is now negative and significant on the intensive margin. Also, *LnAvgTariff* loses significance on the extensive margin and *Governance* loses significance on the intensive margin. As it pertains to the 2004-2009 sample, *NonRecipPref, Governance* and *LnDistance* lose their significance on the intensive margin and *Island* is now positive and significant for both total exports and the intensive margin.

Moreover, the regional fixed effects also give distinct characteristics of where Trinidad and Tobago exports goods. Thus, not surprisingly we find that for both time periods, aggregate export and the intensive margin are greatest for trade with North American Countries. Also, for both time periods, the extensive margin is reduced for trade with African countries. Further, we find that both aggregate export and the intensive margin are reduced for trade with European countries during the later time period suggesting some negative effects of the financial crisis. We also estimate our regressions using country specific fixed effects with the results presented in Table A3-17 in the Appendix. It is evident not only are these results consistent with the results of our regional fixed effects model but with our earlier OLS results.

Alternative Specification and and Estimation Technique

Controlling for Zero flows

Our previous estimation technique and specification only consider positive trade flows and ignore zeros. We are therefore mindful that our results could be biased by the omission of zero trade flows. We know that there are some countries (present in our dataset) where Trinidad and Tobago did not export any products to in specific years. Thus, the values of exports to these countries are zeros for the respective years. Ignoring zeros could potentially lead to inconsistent and biased estimates in gravity models (see Silva and Tenreyro, 2006; Buono and Lalanne, 2010; Christodoulopoulou, 2010; Baier et al., 2011). We therefore incorporate zeros by placing a zero value for those export destinations, present in our respective samples, where Trinidad and Tobago did not export products to in specific years.[31] Our 1996-2003 sample consists 39% zeros, while our 2004-2009 sample consists 35% zero. As Silva and Tenreyro (2006) suggest, we estimate our regressions using the Poisson Pseudo-Maximum Likelihood Estimation (PPML) (also see Buono and Lalanne, 2012; Christodoulopoulou, 2010). In general, the PPML has as its advantages the fact that it gives consistent estimates in the presence of heteroskedasticity and it provides a natural way of dealing with zeros in the dependent variable. We present the results of our PPML estimations in Table 3.9 which follows.

[31] Note that, if during our respective sample periods Trinidad and Tobago did not trade with a particular country in any year; these types of zeros are not included in our dataset.

Table 3.9: Poisson Pseudo-Maximum Likelihood (PPML) Estimation Results on the Determinants of Trade Margins (zeros included in samples).

VARIABLES	1996-2003 (1) Total Exports	(2) Extensive	(3) Intensive	2004-2009 (4) Total Exports	(5) Extensive	(6) Intensive
LnGDP	0.649***	0.335***	0.572***	0.543***	0.315***	0.0166
	(0.130)	(0.0284)	(0.140)	(0.0832)	(0.0358)	(0.187)
CARICOM	3.231***	3.091***	1.680*	1.147*	2.559***	-3.539***
	(0.578)	(0.155)	(0.871)	(0.597)	(0.203)	(1.277)
NonRecipPref	1.082***	1.751***	0.832	-0.486*	0.728***	-1.460***
	(0.317)	(0.200)	(0.910)	(0.286)	(0.181)	(0.430)
LnAvgTariff	0.226	-0.420***	0.217	-0.161	-0.194**	-0.192
	(0.160)	(0.122)	(0.306)	(0.225)	(0.0786)	(0.500)
WTO	3.106***	0.701*	2.806***	6.273***	-0.310	5.774***
	(0.878)	(0.372)	(0.547)	(0.473)	(0.589)	(0.881)
DipMiss	0.473	-0.342***	0.959**	0.475*	-0.0260	0.207
	(0.444)	(0.118)	(0.392)	(0.246)	(0.120)	(0.358)
Governance	-0.435	-0.379***	-0.901**	0.0414	0.0777	-0.165
	(0.292)	(0.0728)	(0.379)	(0.149)	(0.0843)	(0.259)
LnDistance	-0.990***	-0.910***	-0.178	-1.005***	-0.956***	-0.110
	(0.0662)	(0.0400)	(0.183)	(0.0898)	(0.0425)	(0.192)
Language	0.632*	0.832***	-1.331**	0.613**	0.915***	0.312
	(0.339)	(0.0993)	(0.531)	(0.279)	(0.132)	(0.515)
Island	0.385	0.0622	1.738***	0.560	-0.299**	1.618***
	(0.435)	(0.0839)	(0.447)	(0.356)	(0.120)	(0.512)
Landlocked	-3.496***	-0.678*	-2.232***	-2.403***	-0.995***	-1.357**
	(0.518)	(0.360)	(0.770)	(0.543)	(0.311)	(0.575)
Constant	2.230	1.153	-5.394	4.521*	2.667**	8.769
	(3.260)	(0.942)	(3.853)	(2.539)	(1.043)	(5.895)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	No	No	No	No	No
Observations	734	734	734	694	694	694
R-squared	0.559	0.947	0.382	0.450	0.925	0.070

Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1. Dependent variable in column (1) and (4) is total exports (in levels). The dependent variable in column (2) and (5) is extensive margin (in levels) and the dependent variable in column (3) and (6) is the intensive margin (in levels).

The results of our PPML estimations are shown in Table 3.9 above. We observe that the inclusion of zeros does not alter our results very much. Generally, our results are consistent with each other and with our benchmark results. However, a few minor differences are evident. Focusing on the 1996-2003 sample, we observe *WTO* membership now matters for not only total exports but both the intensive and extensive margins. Our finding in this regard corroborates earlier work by Felbermayr and Kohler (2007) and Christodoulopoulou (2010). In both these studies they report a positive WTO effect on the export margins when they use techniques to account for zero trade. Moreover, in addition to being negative for the extensive margin, *DipMiss* now seems to be positive for the intensive margin. Further, the coefficient on *Governance* is now negative for both intensive and extensive margin. Surprisingly, *LnDistance* loses significance on the intensive margin. In addition, *Language* gains significance on the intensive margin and is negative. Also, export destinations that are islands seem to matter only for the intensive margin. And, we now have a negative and significant coefficient with respect to trade with landlocked countries on the extensive margin. Turing our attention to the 2004-2009 sample, we also find results in line with our benchmark results for the same period. Nevertheless, a few slight differences are noticeable. We observe that, *LnGDP* loses its significance on the intensive margin. It is evident that *CARICOM* now has a negative and significant sign on the intensive margin. While the negative sign on the intensive margin seems surprising, it is possible that this may be due to the shock effect of the financial crisis. Also, *NonRecipPref* while still negative and significant on the intensive margin, the coefficient on the extensive margin is now positive and significant. In addition, *LnAvgTariff* gains significance on the extensive margin and is negative. Further, *DipMiss* seems to matter only for total exports with no significant effect on both margins of trade. Also, institutions seem not to matter for both total exports and the trade, the variable *Governance* is not significant in any regression. In addition, *Distance* now loses its significance on the intensive margin. Moreover, although *Language* is still positive for the extensive margin, it loses significance on the intensive margin. Finally, the extensive margin is reduced for exports to islands, but the intensive margin is increased. Notwithstanding the aforementioned differences, the results of our PPML estimations are largely consisntent with each other and with our benchmark results.

Controlling for Endogeniety

We are mindful of the fact that endogeniety could result in biased and inconsistent coefficient estimates. As we indicated in an earlier subsection, our endogeniety concerns pertain to the variable *DipMiss*. In our estimations, we are trying to establish whether the presence of *DipMiss* cause higher exports and hence higher intensive and extensive margins. However, it may be that higher exports and hence higher intensive and extensive margins cause the establishment of *DipMiss* because the government of Trinidad and Tobago may have established Diplomatic relations in export markets where exports are higher. We try to minimize endogeniety concerns by using an alternative variable for *DipMiss* and estimating using the lagged values of this new variable. In this regard, we use a continuous variable, *Log Promotions (-1),* which represents a one period lag on the natural log of per capita expenditure by Trinidad and Tobago Government on Diplomatic Missions and Consulates in export markets, and we estimate our regressions using OLS. The results of our estimations are presented in the table which follows.

Table 3.10: OLS Estimation Results on the Determinants of Trade Margins, controlling for Endogeniety using an alternative variable for DipMiss (Log Promotions (-1).

	1996-2003			2004-2009		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Total Exports	Log Extensive	Log Intensive	Log Total Exports	Log Extensive	Log Intensive
LnGDP	0.857***	0.301***	0.556***	0.854***	0.323***	0.531***
	(0.0737)	(0.0293)	(0.0664)	(0.0832)	(0.0271)	(0.0815)
CARICOM	4.406***	2.655***	1.751***	3.207***	2.161***	1.046**
	(0.559)	(0.215)	(0.458)	(0.514)	(0.203)	(0.466)
NonRecipPref	1.044**	0.715***	0.329	-0.498	0.235	-0.732**
	(0.431)	(0.183)	(0.387)	(0.419)	(0.176)	(0.364)
LnAvgTariff	-0.368	-0.164*	-0.205	0.0117	-0.0172	0.0289
	(0.282)	(0.0932)	(0.259)	(0.252)	(0.0894)	(0.234)
WTO	0.0279	-0.327	0.355	2.689***	-0.816	3.505***
	(0.744)	(0.244)	(0.632)	(0.408)	(0.645)	(0.860)
Log Promotions (-1)	-0.237	-0.354***	0.118	-0.109	-0.294**	0.185
	(0.296)	(0.129)	(0.285)	(0.419)	(0.115)	(0.384)
Governance	-0.260	0.222***	-0.482**	-0.216	0.222***	-0.439**
	(0.241)	(0.0744)	(0.220)	(0.202)	(0.0769)	(0.187)
LnDistance	-2.124***	-1.159***	-0.965***	-2.029***	-1.191***	-0.838***
	(0.154)	(0.0579)	(0.137)	(0.177)	(0.0576)	(0.164)
Language	0.268	0.528***	-0.259	0.163	0.751***	-0.588*
	(0.398)	(0.129)	(0.351)	(0.340)	(0.127)	(0.310)
Island	1.111***	0.284**	0.827**	0.542	0.133	0.408
	(0.375)	(0.113)	(0.341)	(0.339)	(0.116)	(0.319)
Landlocked	-1.150**	-0.0299	-1.120**	-1.176**	-0.275	-0.901
	(0.506)	(0.195)	(0.512)	(0.588)	(0.185)	(0.564)
Constant	8.398***	4.094***	4.304**	5.996**	4.248***	1.748
	(2.385)	(0.842)	(2.082)	(2.381)	(1.037)	(2.411)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	No	No	No	No	No
Observations	454	454	454	418	418	418
R-squared	0.603	0.823	0.272	0.507	0.812	0.234

Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1. In the above regressions, we use an alternative variable Log *Promotions (-1)* for *DipMiss* to minimize endogeniety concerns. *Log Promotions (-1)* represents a one period lag on the natural log of per capita expenditure by Trinidad and Tobago government on Diplomatic Missions and Consulates in export markets.

As show in Table 3.10 above, when we control for endogeniety, we find results that are consistent with each other and with our benchmark results. Most of our explanatory variables have signs and significance in line with our benchmark results suggesting that our results are not very sensitive to endogeniety of our trade promotions variable.[32]

3.5 Conclusions

In this chapter, we pursued two primary objectives. Firstly, we attempted to decompose export growth and to examine the quantitative contributions of the intensive and extensive margins to export growth for Trinidad and Tobago. Secondly, we attempted to explore the role of export destination characteristics (including the nature of their trade policy and institutional attributes) in influencing the intensive and extensive margins of Trinidad and Tobago's export growth. With regard to the decomposition of export growth, for manufactured goods (HS 6-digit), we find that both in periods of economic boom and economic downturn, the extensive margin contributes more significantly to changes in export than the intensive margin. In this regard, our results differ from other empirical studies looking at developed countries (such as Bernard and Jenson, 2004; Haddad et al., 2010). By contrast, for non-manufactured goods, the intensive margin dominates export growth in periods of export boom and dominates export decline in periods of economic downturn. Our results with respect to non-manufactured goods seem to corroborate the findings of previous expirical studies (see Wakasugi, 2009; Haddad et al., 2010).

Turning our attention to the factors influencing the intensive and extensive margins, several important findings emerged from our study. For instance, we find substantial evidence that greater economic size of export destinations *(LnGDP)* increases both the

[32] We also tried using longer lags on our alternative variable, *Log Promotions,* and our main results are unaffected.

intensive and the extensive margins but the effect is stronger on the intensive margin. Also, we find strong evidence that regional integration with trading partners through *CARICOM* increases both the intensive and the extensive margins but the effect is stronger on the extensive margin. Our findings here corroborate earlier work by Ito (2008). Relatedly, we find some evidence that non-reciprocal preferences offered by export destinations *(NonRecipPref)* increase the extensive margin and dampen the intensive margin; but the effects (of non-reciprocal preferences) seem to be sensitive to the time period and the estimation technique. Further, we find some evidence that higher average tariffs in export destinations *(LnAvgTariff)* reduces the extensive margin. By contrast, with regard to the intensive margin, average tariffs in the destination market seem not to matter. Our results with respect to average tariff differ from those of Buono and Lallane (2012) who find robust evidence that higher average tariffs in export destinations reduce the intensive margin; but the effect with respect to the extensive margin, although negative, is smaller and less robust. In addition, we find some evidence that the intensive margin is increased for exports to destinations that are WTO members but the effect seems to be sensitive to the estimation technique. We find less robust evidence that WTO membership increases the extensive margin. Also, we find some evidence that the presence of Diplomatic Missions in export markets *(DipMiss)* dampens the extensive margin, but the effect seems sensitive to the time period. With regard to the intensive margin, the presence of Diplomatic Missions seems to increase the intensive margin but the evidence is less robust. Our results with respect to Diplomatic Missions contrast with those of Volpe-Martincus et al. (2010b) who find a positive and highly significant effect of economic diplomacy on both margins of trade. One reason for the difference is that while our economic diplomacy variable is captured by a dummy, they use the actual number of Embassies to capture their variable. Moreover, we find some evidence that better institutional quality and governance in export markets *(Governance)* dampens the intensive margin but the effect on the extensive margin seems less robust. It seems evident that rather that capturing institutional quality in the export markets this variable may be capturing the effect of stiffer competition in developed country markets. Finally, looking at the standard gravity covariates, our results seem to be in line with our theoretical priors and the findings of several empirical studies. For example, we find robust evidence that greater distance from export markets *(LnDistance)* dampens both trade margins but the effect is stronger on the extensive margin. We also find strong evidence that the extensive margin is higher in export markets where English is the main language, however we find a negative effect on the intensive margin but this result is less robust. Further, we find that trade with islands enhances both margins but our results seem to be sensitive to the time period and the estimation technique. Finally, we find substantial evidence that trade with landlocked countries reduces the intensive margin but the effect on the extensive margin is less robust.

Our findings do convey some important messages in terms of trade policy formulation. Our results suggest that regional integration through CARICOM is beneficial to Trinidad and Tobago manufacturing exports and should be strengthened and enhanced. In this regard, one possible approach to enhancing the benefits offed by CARICOM could be through the establishment of CARICOM-bilateral trade agreements with neighbouring countries such as Panama and Guatemala. This could serve to expand the CARICOM market enabling member countries to enjoy additional benefits associated with economies of scale. Our results also suggest that non-reciprocal preferences may not be that effective in enhancing the growth of new products. This may be indicative of the fact that non-reciprocal proferences are granted to a limited number of products. This may suggest the need for Trinidad and Tobago to collaborate with other CARICOM trading partners to lobby the countries which grant non-reciprocal preferences to increase the range of products covered under the respective schemes. The limited effectiveness of non-reciprocal preferences in increasing the extensive margin may also suggest that Trinidad and Tobago manufacturers are not fully exploiting available prefereces. This may point to the need for greater information sharing with prospective exporters about opportunities available and well as initiatives to encourage innovation and product discovery. Also, our results suggest that WTO membership of trade partners may have greater impact in increasing the value of existing exports (intensive margin) rather than encouraging new exports (extensive margin). It may be necessary for a closer examination to be made as to why this is occurring so that appropriate initiatives could be implemented for more benefitial trade with WTO member countries. Also, our findings suggest that Diplomatic Mission and Consulates have a greater impact in enhancing trade of existing products rather than new products. This result is consistent with the view that Embassies and Consulates may not have the specialist staff to assist exporters of new products in the same way they could assist existing exporters (see Volpe-Martincus et al., 2010b; Moons, 2012). This may speak to the need to hire specialist staff in these agencies to assist specifically with trade promotion activities. Finally, the fact that the intensive and extensive margins are influenced by natural factors such as distance from export market, whether the export destination is landlocked or not and whether the export destination is an island or not suggests that not all the factors required to expand trade along both margins are amenable to public policy intervention. This certainly will serve to increase the challenge of trade expansion along both margins.

Our work contributes to several strands of the international trade literature. For example, we provide fresh evidence on the quantitative contribution of the intensive and extensive margins to export growth in a small developing country context. More importantly, we provide fresh empirical evidence on the impact of WTO membership on both trade and the margins of trade to complement some empirical studies addressing these issues (for example Rose, 2004; Felbermayr and Kohler, 2007; Wakasugi, 2009;

Christodoulopoulou, 2010; Buono and Lalanne, 2012). Further, our work provides new evidence on the impact of trade cost reductions (including tariff and preferences) on the margins of trade to complement a few empirical studies looking at this issue (see Lawless, 2010; Crozet and Koenig, 2010; Debaere and Mostashari, 2010; Bouno and Lalanne, 2012). Finally, we provide new evidence on the effect of economic diplomacy on the margins of trade (see Volpe-Martincus, 2010a and 2010b; Moons, 2012).

The present work is not without limitations and several important areas for future research remain. First, in terms of the decomposition of export growth into the trade margins, we use information on the value of exports. By doing so, we are unable to ascertain how much of the changes in each margin are driven by price changes and how much are driven by quantity changes. This information is important as changes in the margins that are driven by quantity changes could have greater implications for development. Given that for a significant period in our dataset, Trinidad and Tobago experienced an energy boom, information on whether changes in the trade margins were driven by quantity changes or price changes would be helpful. Second, we capture the effect of trade promotions in export markets by the use of a dummy variable *DipMiss*. However, trade promotions in export markets are sometimes done via Trade Missions that are conducted by various government ministries and this is not captured by our measure. Ignoring the effect of trade promotions by other agencies could result in biased estimates. Also, by using a dummy variable to capture the effect of Diplomatic Missions, our measure of trade promotions cannot capture increases in the extent of quality of promotions. For instance, in the case of United States and Canada there are several Diplomatic Missions established in these markets and this is not captured by our measure. In an attempt to minimize some of these concerns in our future work, subject to the availability of the relevant data, we propose to use a richer variable to capture trade promotion such as per capita spending by Diplomatic Missions and Consulates as well as Trade Missions. Using this continuous variable allows us additional flexibility in finding some appropriate instrument and estimating our regressions using Two-Stage Least Squares (2SLS) to address potential endogeniety concerns with respect to our trade promotion variable. Third, the measure of extensive margin used in our estimations by construction incorporates both new and existing products. As part of our future research agenda, we may want to separate the two enabling us to study what determines the number the new products specifically. This information could prove even more vital for trade policy formulation. The fourth and final issue pertains to the fact that our study focuses exclusively on goods. We ignored services exports as reliable data on the export of services were not available. We are mindful that trade in services could be an important source of trade expansion. Therefore, our study could be enhanced by incorporating data on export of services in our analysis.

Appendix A3

Table A3-1: Results of Decomposition of Export Growth into Intensive and Extensive Margins from Previous Studies.

No.	Study	Decomposition Method	Results of Decomposition of Export Growth
1	Hillberry and McDaniels (2002)	Hummel and Klenow	Most of US export growth with NAFTA partners for the period 1993-2001 was attributed to changes at the intensive margin. For US exports to Mexico, the extensive margin accounted for only 8.3 %. Similarly, for US exports to Canada, the extensive margin accounted for only 3.4%.
2	Broada and Weinstein (2004)	Feenstra index of variety	For all countries, variety growth (extensive margin) accounted for 30% of export growth to the US market. On bilateral basis, China accounted for 5% and 6% of US variety growth between 1972-1988 and 1990-2001, respectively.
3	Hummels and Klenow (2005)	Feenstra index of variety	Extensive margin accounts for 60 % of export growth in larger economies.
4	Felbermayr and Kohler (2006)	"Multilateral" Decomposition	For the period 1970-1997, 40% of world trade came from movements at the extensive margin.
7	Amiti and Freund (2007)	Amiti and Freund	For the period 1992-2006, 99.8 % of China's export growth is due to the intensive margin.
8	Amurgo-Pacheco and Pierola (2007)	"Multilateral" Decomposition	The intensive margin accounts for 86% and the extensive margin accounts for 14 % of the overall export growth for the period 1995-2005 for 24 developed and developing countries. Also, the extensive margin is relatively more important in poorer regions than in developed regions
11	Luo (2008)	Amiti and Freund	For the period 1997-2007, 84% of China's export growth was introduced by intensive margin.
15	Liapis (2009)	Amiti and Freund	About 52 % of the growth in agricultural exports took place at the intensive margin.
17	Bernard et al. (2009)	"Multilateral" Decomposition	Most short-run (one year) changes in US exports were accounted for by the intensive margin, while most long run changes (1993-2003) were accounted for by the extensive margin. The intensive margin accounted for an average of 101% of the year-to-year changes in exports, ranging from a high of 294% for 2001-2002 to a low of 46% in 1995-1996. Over the period 1993-2003, 66% of export growth occurred at the extensive margin.
20	Debaere and Mostashari (2010)	Count	For manufactured goods exports of all exporters to the United States between 1989-1999 (HTS 6 -digit), find that for around 85% of the countries that export to the United States, over 40% of all goods categories that these countries exported in 1999 were not exported in 1989. In terms of trade volumes, for around 50% of these countries, over 40% of the volume of 1999 trade was from goods that were not exported in 1989.
23	Besedes and Prusa (2011)	"Multilateral" Decomposition	Extensive margin changes account for only 17% of growth with respect to US market and 41% to the EU-15.
24	Berthelon (2011)	Amiti and Feund and "Multilateral Decomposition"	On a multilateral basis (all countries), for the period 1990-1999, 54 % (the most) of Chile's export growth was attributed to the extensive margin and looking at the period 1999-2007 finds that 36 % of Chile's export growth was attributed to the extensive margin. On a bilateral basis, most of Chile's export growth to Brazil, Ecuador and Mexico were on the extensive margin. For example for Brazil over the period 1990-1999, the extensive margin accounted for 69 % of export growth ,while in the period 1999-2007, the extensive margin accounted for 77 % of export growth.
25	Maeno (2011)	Amiti and Feund	Most of Japan's export growth attributed to the intensive margin. With respect to all goods, for the period 1988-1998, the extensive margin accounted for only 23 % of export growth with the intensive margin accounting for 77%. For manufactured goods, during the same period, the intensive margin contributed slightly higher (25%) with the intensive margin contributing 75%. For the period 1998-2007, for all goods, the intensive margin contributed 41%, while the intensive margin contributed 59% of export growth. For manufactured goods, during the same period, the intensive margin contributed 50% of export growth.

Note: Studies are numbered as in Table 3.1.

Table A3-2: Model Specification and Estimation Techniques of Empirical Studies examining the factors influencing the Intensive and Extensive Margins.

Study (No. as in Table 3.1**)**	**4**	**5**	**6**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**18**	**19**	**20**	**21**	**22**	**25**	**26**
Dependent Variable																			
Intensive Margin	X	X		X	X	X		X		X			X	X			X		X
Extensive Margin	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Independent Variables																			
Importers GDP		X	X	X	X	X					X	X	X	X			X	X	X
Exporters GDP			X				X		X			X	X					X	
GDP of Exporters plus Importers										X									
GDP of Exporters times Importers	X																		
GDP Growth of Importing Country								X							X				
GDP per Capita of importers					X										X				
Population Exporting Country									X			X							
Population Importing Country												X					X		
Exporting country GDP Deflator		X																	
Migration stock in exporting country		X																	
Distance	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X
Remoteness																		X	
Language Dummy	X		X		X			X	X			X		X	X	X	X		
Border Dummy	X		X					X	X			X		X	X	X			
Colony Dummy	X								X			X	X	X		X			X
Island		X																	X
WTO Dummy	X		X			X		X				X							X
Euro Dummy										X									
NAFTA Dummy							X												
Landlocked Dummy	X				X				X			X				X			X
PTA Dummy	X		X	X		X						X	X			X			
GSP Preferences						X									X				X
ACP Preferences						X													
Currency Union Dummy												X							
Trade Promotion Organization																X			
Embassy/Consulate																X			

continued

Table A3-2 continued

Study (No. as in Table 3.1**)**	**4**	**5**	**6**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**18**	**19**	**20**	**21**	**22**	**25**	**26**
Religion Dummy												X							
Legal												X							
Firm Size (Employment)										X									
Export Transactions Cost									X								X		
Average Tariff of importing country									X						X				X
Infrastructure quality of Destination																			
Main Estimation Techniques																			
OLS	X	X	X					X					X	X		X	X	X	X
Probit	X		X			X					X				X				X
Tobit	X		X	X		X	X				X								X
Hausman and Taylor Estimator (HT)										X									
Poisson									X							X			
Random Effect Estimator					X														
Fixed Effect Estimator								X											
Heckman												X							

Table A3-3: Results of Empirical Testing on the factors influencing the Extensive Margin.

Study (No. as in Table 3.1**)**	**4**	**5**	**6**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**18**	**19**	**20**	**21**	**22**	**25**	**26**	**Expected sign**
Independent Variables																				
Importers GDP		+***	+**	+***	+*	+ns					+***	+***	+*	+***			+***	+**	+***	+
Exporters GDP			+**				+***		+***			+***	+ns					+**		+
GDP of Exporters plus Importers										+***										+
GDP of Exporters times Importers	-nr																			+
GDP Growth of Importing Country								+nr							-***					+
GDP per Capita of importers					*										+***					+
Population Exporting Country									+***			+***								±
Population Importing Country												-***					+***			±
Exporting country GDP Deflator		+***																		+
migration stock in exporting country		+***																		+
Distance	-nr	-***	-**	-***	-*			-nr	-***	-***	-***	-***	-***	-***	-***	-***	-***	-**	-***	-
Remoteness																		+*		-
Language Dummy	+nr		+**		*+			+nr	+*			+***		+***	-***	+***	+***			+
Border Dummy	-nr		+**					+nr	+**			+***		-ns	-***	+***				+
Colony Dummy	+nr								+***			+***	+***	+***		+*			+***	+
Island		+***																	+***	+
WTO Dummy	+nr		+**			-ns		+nr				+***							+***	+
Euro Dummy										+ns										+

continued

Table A3-3 continued

Study (No. as in Table 3.1**)**	**4**	**5**	**6**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**18**	**19**	**20**	**21**	**22**	**25**	**26**	**Expected signs**
NAFTA Dummy							+***													+
Landlocked Dummy	+nr				-*				-***			+***				-***			-***	-
PTA Dummy	+nr		-*	-***		-ns						+***	+ns			+***				±
GSP Preferences						+***									-*				-***	+
ACP Preferences						-***														+
Currency Union Dummy												+***								+
Trade Promotion Organization																+***				+
Embassy/Consulate																+***				+
Religion Dummy												+***								+
Legal												+***								+
Openness	-ns																			+
Firm Size (Employment)										+***										+
Export Transactions Cost									-***								-***			-
Average Tariff of importing country									+**						-***				-***	-
Infrastructure quality of Destination																	+**			+

Note: nr means the level of significance is not reported, ns means not significant, + and - indicates positive and negative signs on the coefficients, respectively. Note that ***indicates significance at 1%, ** indicates significance at 5% and indicates significance at 10%.

Table A3-4: Results of Empirical Testing on the factors influencing the Intensive Margin.

Study (No. as in Table 3.1**)**	**4**	**5**	**8**	**9**	**10**	**12**	**14**	**18**	**19**	**22**	**26**	**Expected Signs**
Independent Variables												
Importers GDP		+***	+***	+*	+ns			+s***	+***	+***	+***	+
Exporters GDP								-ns				+
GDP of Exporters plus Importers							+***					+
GDP of Exporters times Importers	+nr											+
GDP Growth of Importing Country						-nr						+
GDP per Capita of importers				+ns								+
Population of importing Countries										-ns		±
Exporting country GDP Deflator		-***										+
Migration stock in exporting country		-ns										+
Distance	-nr	-***	-***	-*		-nr	-***	-***	-***	-***	-***	-
Language Dummy	+nr			+ns		+nr			+***	-ns		+
Border Dummy	+nr					+nr			-*			+
Colony Dummy	-nr							+***	+***		+***	+
Island		-***									+***	+
WTO Dummy	+nr				-ns	+nr					+***	+
Euro Dummy							+ns					+
Landlocked Dummy	-nr			-*							-***	-
PTA Dummy	-nr		-***		-ns			+***				±
GSP Preferences					+***						+***	+
ACP Preferences					-***							+
Firm Size (Employment)							+***					+
Export Transactions Cost										-ns		-
Average Tariff of importing country											-***	-
Infrastructure quality of Destination										-*		+

Note: nr means the level of significance is not reported, ns means not significant, + and - indicates positive and negative signs on the coefficients, respectively. Note that ***indicates significance at 1%, ** indicates significance at 5% and indicates significance at 10%.

Table A3-5: Decomposition of Trinidad and Tobago's Export Growth to all countries.

	Data Type	HS 6-digit manufactured goods					HS 6-digit non-manufactured goods					HS 8-digit manufactured goods				
	Time Horizon	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**
1	New Product $\left(V_t(I^{NP})\right)$	25.24	69.84	20.79	0.00	260.00	51.70	80.30	,180.00	0.00	4,020.0	26.51	71.11	23.81	0.00	271.43
2	Drop Product $\left(V_0(I^{DP})\right)$	13.68	23.97	51.27	259.00	65.90	07.00	175.00	217.00	713.00	160.00	14.52	26.98	52.86	263.49	68.57
3	**Net Product Growth(1)-(2)**	**11.56**	**45.87**	**-30.48**	**-259.00**	**194.10**	**-55.30**	**-94.70**	**963.00**	**-713.00**	**3,860.0**	**11.98**	**44.13**	**-29.05**	**-263.49**	**202.86**
4	New Destination $\left(V_t(I^{ND})\right)$	26.83	55.08	21.11	168.00	179.00	50.20	78.90	1,350.00	749.00	1,940.0	27.78	56.03	24.13	169.84	184.13
5	Drop Destination $\left(V_0(I^{DD})\right)$	8.87	22.86	56.67	254.00	61.40	72.20	151.00	171.00	676.00	132.00	9.63	25.87	58.10	257.14	60.63
6	**Net Destination Growth (4)-(5)**	**17.95**	**32.22**	**-35.56**	**-86.00**	**117.60**	**-22.00**	**-72.10**	**1,179.0**	**73.00**	**1,808.0**	**18.14**	**30.16**	**-33.97**	**-87.30**	**123.49**
7	New Product-Destination $\left(V_t(I^{NPD})\right)$	0.00	2.49	0.00	0.00	15.70	0.00	1.71	5.35	0.00	20.30	0.00	2.49	0.00	0.00	15.68
8	Drop Product- Destination $\left(V_0(I^{DPD})\right)$	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
9	**Net Product-Destination Growth(7)-(8)**	**0.00**	**2.49**	**0.00**	**-0.01**	**15.70**	**0.00**	**1.71**	**5.35**	**0.00**	**20.30**	**0.00**	**2.49**	**0.00**	**0.00**	**15.68**
10	**Net Extensive (3+6+9)**	**29.51**	**80.58**	**-66.03**	**-345.01**	**327.40**	**-77.30**	**-165.09**	**2,147.3**	**-640.00**	**5,688.3**	**30.13**	**76.77**	**-63.01**	**-350.80**	**342.03**
11	Old Product-Destination value at time t	166.67	246.00	466.67	327.00	116.00	959.00	2,600	7,950	7,840	4,480	165.08	246.03	463.49	325.40	104.44
12	Old Product-Destination Value at time 0	140.63	212.70	309.52	505.00	88.40	1,080	1,230	4,680	11,700	1,030	139.84	211.11	307.94	500.00	85.71
13	**Net Intensive (11)-(12)** $\left(\Delta V(I^E)\right)$	**26.03**	**33.30**	**157.14**	**-178.00**	**27.60**	**-121.00**	**1,370.0**	**3,270.0**	**-3,860**	**3,450.0**	**25.24**	**34.92**	**155.56**	**-174.60**	**18.73**
14	**Total Change in Exports(10)+(13)**	**55.54**	**113.88**	**91.11**	**-523.01**	**355.00**	**-198.30**	**1,204.9**	**5,417.3**	**-4,500.**	**9,138.3**	**55.37**	**111.69**	**92.54**	**-525.40**	**360.76**
15	**% of Exports growth due to Extensive Margin 10/14**	**53.13**	**70.76**	**-72.47**	**65.97**	**92.23**	**39.00**	**-13.70**	**39.64**	**14.22**	**62.25**	**54.42**	**68.74**	**-68.09**	**66.77**	**94.81**
16	**% Exports growth due to Intensive Margin 13/14**	**46.87**	**29.24**	**172.47**	**34.03**	**7.77**	**61.00**	**113.70**	**60.36**	**85.78**	**37.75**	**45.58**	**31.26**	**168.09**	**33.23**	**5.19**
17	**% Contribution of New Products to Extensive 3/10**	**39.16**	**56.93**	**46.15**	**75.07**	**59.29**	**72.00**	**57.36**	**44.85**	**111.41**	**67.86**	**39.78**	**57.48**	**46.10**	**75.11**	**59.31**
18	**% Contribution of New Destination to Extensive 6/10**	**60.84**	**39.99**	**53.85**	**24.93**	**35.92**	**28.00**	**43.67**	**54.90**	**-11.41**	**31.78**	**60.22**	**39.28**	**53.91**	**24.89**	**36.11**
19	**% Contribution of New Product-Destination to Extensive 9/10**	**0.01**	**3.09**	**0.00**	**0.00**	**4.80**	**0.00**	**-1.04**	**0.25**	**-0.00**	**0.36**	**0.01**	**3.24**	**0.00**	**0.00**	**4.59**

Notes: Export values contained in rows 1 to 14 are quoted in US$ million. New products mean old destination and new products. New destinations mean old products and new destination. New product-destination means new product and new destination. Likewise drop products mean old destination and dropped product. Drop Destination mean old product and drop destination. Drop product-destination means drop product and drop destination.

Table A3-6: Number of products exported by Trinidad and Tobago (Manufactured Goods, HS 6-digit).

Time Horizon	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**
New Product	2,081	2,726	2,503	0
Drop Product	1,683	2,976	2,654	3,307
New Destination	1,880	2,458	2,391	2,098
Drop Destination	1,608	2,700	2,388	2,930
New Product-Destination	1	2	2	0
Drop Product-Destination	0	2	1	1
Old Product-Destination at time t	3,024	3,811	3,739	3,670
Old Product-Destination at time 0	3,024	3,811	3,739	3,670

Table A3-7: Decomposition of Trinidad and Tobago's Export Growth by income classification for Manufactured Goods (HS 6-digit level).

	Income Classification	**High Income**					**Middle Income**					**Low Income**				
	Time Horizon	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**
1	New Product $(V_t(I^{NP}))$	19.40	21.70	10.30	0.00	63.20	4.68	47.10	8.03	0.00	179.37	0.21	0.13	0.81	0.00	3.73
2	Drop Product $(V_0(I^{DP}))$	3.02	10.80	27.30	53.20	11.70	9.62	9.97	21.90	203.00	50.16	0.20	0.71	0.20	0.64	0.41
3	**Net Product Growth(1)-(2)**	**16.38**	**10.90**	**-17.00**	**-53.20**	**51.50**	**-4.94**	**37.13**	**-13.87**	**-203.00**	**129.21**	**0.01**	**- 0.58**	**0.61**	**-0.64**	**3.32**
4	New Destination $(V_t(I^{ND}))$	3.13	22.90	4.65	13.60	6.51	4.08	27.10	7.19	147.00	144.44	0.04	0.00	0.03	2.65	0.00
5	Drop Destination $(V_0(I^{DD}))$	1.86	8.92	32.40	50.30	6.37	5.67	9.21	21.30	200.00	41.90	0.00	0.00	0.00	0.00	0.00
6	**Net Destination Growth (4)-(5)**	**1.27**	**13.98**	**-27.75**	**-36.70**	**0.14**	**-1.59**	**17.89**	**-14.11**	**-53.00**	**102.54**	**0.04**	**0.00**	**0.03**	**2.65**	**0.00**
7	New Product-Destination $(V_t(I^{NPD}))$	2.06	0.00	0.00	0.00	5.57	0.00	2.79	0.00	0.03	7.46	0.00	0.07	0.17	0.00	2.68
8	Drop Product- Destination $(V_0(I^{DPD}))$	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.07	0.05	0.00
9	**Net Product-Destination Growth(7)-(8)**	**2.06**	**-0.00**	**0.00**	**0.00**	**5.57**	**0.00**	**2.78**	**0.00**	**0.03**	**7.46**	**-0.00**	**0.07**	**0.10**	**-0.04**	**2.68**
10	**Net Extensive (3+6+9)**	**19.71**	**24.88**	**-44.75**	**-89.90**	**57.21**	**-6.53**	**57.80**	**-27.98**	**-255.97**	**239.21**	**0.05**	**-0.51**	**0.74**	**1.96**	**6.00**
11	Old Product-Destination value at time t	41.10	117.00	214.00	76.20	25.90	121.00	125.00	248.00	232.00	87.78	0.77	0.39	0.12	3.83	0.26
12	Old Product-Destination Value at time 0	33.30	71.40	117.00	175.00	24.60	103.00	137.00	189.00	286.00	62.54	0.26	0.38	0.19	11.10	0.05
13	**Net Intensive (11)-(12)** $(\Delta V(I^E))$	**7.80**	**45.60**	**97.00**	**-98.80**	**1.30**	**18.00**	**-12.00**	**59.00**	**-54.00**	**25.24**	**0.51**	**0.01**	**-0.07**	**-7.27**	**0.20**
14	**Total Change in Exports(10)+(13)**	**27.51**	**70.48**	**52.25**	**-188.70**	**58.51**	**11.47**	**45.80**	**31.02**	**-309.97**	**264.44**	**0.56**	**-0.50**	**0.67**	**-5.31**	**6.21**
15	**% of Exports growth due to Extensive Margin 10/14**	**71.64**	**35.30**	**-85.64**	**47.64**	**97.78**	**-56.93**	**126.20**	**-90.19**	**82.58**	**90.46**	**8.81**	**102.49**	**109.83**	**-37.01**	**96.70**
16	**% Exports growth due to Intensive Margin 13/14**	**28.36**	**64.70**	**185.64**	**52.36**	**2.22**	**156.93**	**-26.20**	**190.19**	**17.42**	**9.54**	**91.19**	**-2.49**	**-9.83**	**137.01**	**3.30**
17	**% Contribution of New Products to Extensive 3/10**	**83.11**	**43.81**	**37.99**	**59.18**	**90.02**	**75.65**	**64.23**	**49.57**	**79.31**	**54.01**	**22.83**	**112.84**	**83.17**	**-32.69**	**55.30**
18	**% Contribution of New Destination to Extensive 6/10**	**6.44**	**56.19**	**62.01**	**40.82**	**0.24**	**24.35**	**30.95**	**50.43**	**20.71**	**42.87**	**77.22**	**-0.11**	**3.41**	**134.91**	**0.00**
19	**% Contribution of New Product-Destination to Extensive 9/10**	**10.44**	**-0.00**	**-0.00**	**0.00**	**9.74**	**0.00**	**4.82**	**-0.01**	**- 0.01**	**3.12**	**-0.05**	**-12.73**	**13.41**	**-2.21**	**44.70**

Notes: Notes: Export values contained in row 1 to 14 are quoted in US$ million. New products mean old destination and new products. New destinations mean old products and new destination. New product-destination means new product and new destination. Likewise drop products mean old destination and dropped product. Drop Destination mean old product and drop destination. Drop product-destination means drop product and drop destination.

Table A3-8: Decomposition of Trinidad and Tobago's Export Growth by income classification for Manufactured Goods (HS 8-digit level).

	Income Classification	**High Income**					**Middle Income**					**Low Income**				
	Time Horizon	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**
1	New Product $\left(V_t(I^{NP})\right)$	19.70	22.20	10.80	0.00	64.30	5.67	47.90	10.50	0.00	188.89	0.24	0.13	0.81	0.00	0.05
2	Drop Product $\left(V_0(I^{DP})\right)$	3.17	12.90	27.60	54.30	12.60	10.30	11.00	23.30	206.00	51.90	0.20	0.71	0.20	0.64	0.41
3	**Net Product Growth(1)-(2)**	**16.53**	**9.30**	**-16.80**	**-54.30**	**51.70**	**-4.63**	**36.90**	**-12.80**	**-206.00**	**136.98**	**0.04**	**-0.58**	**0.61**	**-0.64**	**-0.36**
4	New Destination $\left(V_t(I^{ND})\right)$	3.29	23.00	4.90	13.80	6.19	4.71	27.60	9.54	148.00	149.52	0.04	0.00	0.03	2.63	0.00
5	Drop Destination $\left(V_0(I^{DD})\right)$	1.98	10.80	32.40	59.80	6.70	6.25	10.10	22.40	202.00	41.75	0.00	0.00	0.00	0.00	0.00
6	**Net Destination Growth (4)-(5)**	**1.31**	**12.20**	**-27.50**	**-46.00**	**-0.51**	**-1.54**	**17.50**	**-12.86**	**-54.00**	**107.78**	**0.04**	**0.00**	**0.03**	**2.63**	**0.00**
7	New Product-Destination $\left(V_t(I^{NPD})\right)$	2.06	0.00	0.00	0.00	5.57	0.00	2.79	0.00	0.03	7.46	0.00	0.07	0.17	0.00	2.68
8	Drop Product- Destination $\left(V_0(I^{DPD})\right)$	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.07	0.05	0.00
9	**Net Product-Destination Growth(7)-(8)**	**2.06**	**-0.00**	**0.00**	**0.00**	**5.56**	**0.00**	**2.78**	**0.00**	**0.03**	**7.46**	**-0.00**	**0.07**	**0.10**	**-0.04**	**2.68**
10	**Net Extensive (3+6+9)**	**19.90**	**21.50**	**-44.30**	**-100.30**	**56.75**	**-6.17**	**57.18**	**-25.66**	**-259.97**	**252.22**	**0.08**	**-0.51**	**0.74**	**1.95**	**2.32**
11	Old Product-Destination value at time t	40.80	116.00	213.00	75.60	24.60	120.00	124.00	244.00	230.00	77.46	0.75	0.39	0.12	3.73	0.15
12	Old Product-Destination Value at time 0	33.20	69.40	117.00	173.00	23.80	102.00	136.00	187.00	283.00	60.79	0.26	0.38	0.19	11.10	0.05
13	**Net Intensive (11)-(12)** $\left(\Delta V(I^{E})\right)$	**7.60**	**46.60**	**96.00**	**-97.40**	**0.80**	**18.00**	**-12.00**	**57.00**	**-53.00**	**16.67**	**0.49**	**0.01**	**-0.07**	**-7.37**	**0.10**
14	**Total Change in Exports(10)+(13)**	**27.50**	**68.10**	**51.70**	**-197.70**	**57.55**	**11.83**	**45.18**	**31.34**	**-312.97**	**268.89**	**0.56**	**-0.50**	**0.67**	**-5.42**	**2.43**
15	**% of Exports growth due to Extensive Margin 10/14**	**72.36**	**31.57**	**-85.68**	**50.73**	**98.61**	**-52.16**	**126.56**	**-81.86**	**83.07**	**93.80**	**13.56**	**102.51**	**109.83**	**-35.92**	**95.71**
16	**% Exports growth due to Intensive Margin 13/14**	**27.64**	**68.43**	**185.68**	**49.27**	**1.39**	**152.16**	**-26.56**	**181.86**	**16.93**	**6.20**	**86.44**	**-2.51**	**-9.83**	**135.92**	**4.29**
17	**% Contribution of New Products to Extensive 3/10**	**99.00**	**103.26**	**-24.38**	**0.00**	**113.31**	**75.04**	**64.53**	**49.89**	**79.24**	**54.31**	**49.86**	**112.84**	**83.17**	**-32.96**	**-15.53**
18	**% Contribution of New Destination to Extensive 6/10**	**6.58**	**56.74**	**62.08**	**45.86**	**-0.90**	**24.96**	**30.60**	**50.12**	**20.77**	**42.73**	**50.18**	**-0.11**	**3.41**	**135.03**	**0.00**
19	**% Contribution of New Product-Destination to Extensive 9/10**	**10.34**	**-0.00**	**-0.00**	**0.00**	**9.80**	**0.00**	**4.87**	**- 0.01**	**-0.01**	**2.96**	**-0.03**	**-12.73**	**13.41**	**-2.07**	**115.53**

Notes: Notes: Notes: Export values contained in row 1 to 14 are quoted in US$ million. New products mean old destination and new products. New destinations mean old products and new destination. New product-destination means new product and new destination. Likewise drop products mean old destination and dropped product. Drop Destination mean old product and drop destination. Drop product-destination means drop product and drop destination.

Table A3-9: Decomposition of Trinidad and Tobago's Export Growth by income classification for non-Manufactured Goods (HS 6-digit level).

	Income Classification	**High Income**					**Middle Income**					**Low Income**				
	Time Horizon	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**	**1996-1998**	**1999-2003**	**2004-2006**	**2007-2009**	**1996-2009**
1	New Product $(V_t(I^{NP}))$	23.50	29.70	954.00	0.00	2,350.00	26.00	25.40	216.00	0.00	1,480.00	0.92	0.34	2.43	0.00	6.05
2	Drop Product $(V_0(I^{DP}))$	82.70	73.50	146.00	302.0	82.10	21.30	87.60	69.50	392.00	69.70	0.74	11.11	0.32	0.53	2.81
3	**Net Product Growth(1)-(2)**	**-59.20**	**-43.80**	**808.00**	**-302.**	**2,267.9**	**4.70**	**- 62.20**	**146.50**	**-392.00**	**1,410.3**	**0.18**	**-10.77**	**2.11**	**- 0.53**	**3.24**
4	New Destination $(V_t(I^{ND}))$	18.90	29.40	1,100.00	375.0	887.00	13.90	19.50	213.00	324.00	138.00	0.01	0.38	0.00	2.79	0.00
5	Drop Destination $(V_0(I^{DD}))$	28.90	33.70	118.00	248.0	44.30	21.10	54.60	34.10	183.00	63.70	0.00	2.81	0.00	6.41	0.12
6	**Net Destination Growth (4)-(5)**	**-10.00**	**-4.30**	**982.00**	**127.0**	**842.70**	**-7.20**	**-35.10**	**178.90**	**141.00**	**74.30**	**0.01**	**-2.43**	**0.00**	**-3.62**	**-0.11**
7	New Product-Destination $(V_t(I^{NPD}))$	0.00	1.70	5.24	-0.00	16.80	0.01	0.06	0.13	0.01	6.02	0.00	0.08	0.18	0.15	21.27
8	Drop Product- Destination $(V_0(I^{DPD}))$	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.35	0.01	0.00	0.04
9	**Net Product-Destination Growth(7)-(8)**	**0.00**	**1.70**	**5.24**	**-0.03**	**16.80**	**0.01**	**0.06**	**0.13**	**0.01**	**5.98**	**-0.00**	**-0.26**	**0.17**	**0.15**	**21.23**
10	**Net Extensive (3+6+9)**	**-69.20**	**-46.40**	**1,795.24**	**-175.**	**3,127.4**	**-2.49**	**-97.24**	**325.53**	**-250.99**	**1,490.5**	**0.19**	**-13.46**	**2.28**	**-4.01**	**24.35**
11	Old Product-Destination value at time t	744.00	2,290.00	7,330.00	6,210.	4,210.0	203.00	294.00	584.00	1,420.00	254.00	1.48	2.24	5.06	7.38	1.45
12	Old Product-Destination Value at time 0	887.00	995.00	4,320.00	9,370	887.00	181.00	219.00	344.00	2,020.00	135.00	2.32	0.61	0.33	24.90	0.20
13	**Net Intensive (11)-(12)** $(\Delta V(\boldsymbol{I^E}))$	**-143.00**	**1,295.00**	**3,010.00**	**-3,160**	**3,323.0**	**22.00**	**75.00**	**240.00**	**-600.00**	**119.00**	**-0.84**	**1.63**	**4.74**	**-17.52**	**1.24**
14	**Total Change in Exports(10)+(13)**	**- 212.20**	**1,248.60**	**4,805.24**	**-3,335**	**6,450.40**	**19.51**	**-22.24**	**565.53**	**- 850.99**	**1,609.58**	**-0.65**	**-11.84**	**7.01**	**-21.53**	**25.60**
15	**% of Exports growth due to Extensive Margin 10/14**	**32.61**	**-3.72**	**37.36**	**5.25**	**48.48**	**-12.77**	**437.23**	**57.56**	**29.49**	**92.61**	**-29.70**	**113.74**	**32.48**	**18.61**	**95.15**
16	**% Exports growth due to Intensive Margin 13/14**	**67.39**	**103.72**	**62.64**	**94.75**	**51.52**	**112.77**	**-337.23**	**42.44**	**70.51**	**7.39**	**129.70**	**-13.74**	**67.52**	**81.39**	**4.85**
17	**% Contribution of New Products to Extensive 3/10**	**85.55**	**94.40**	**45.01**	**172.54**	**72.52**	**-188.68**	**63.97**	**45.00**	**156.18**	**94.61**	**95.67**	**79.99**	**92.64**	**13.23**	**13.30**
18	**% Contribution of New Destination to Extensive 6/10**	**14.45**	**9.27**	**54.70**	**-72.56**	**26.95**	**289.05**	**36.10**	**54.96**	**-56.18**	**4.98**	**4.68**	**18.06**	**0.05**	**90.39**	**-0.47**
19	**% Contribution of New Product-Destination to Extensive 9/10**	**0.00**	**-3.66**	**0.29**	**0.02**	**0.54**	**-0.36**	**-0.06**	**0.04**	**-0.00**	**0.40**	**-0.35**	**1.95**	**7.31**	**-3.62**	**87.18**

Notes: Notes: Export values contained in row 1 to 14 are quoted in US$ million. New products mean old destination and new products. New destinations mean old products and new destination. New product-destination means new product and new destination. Likewise drop products mean old destination and dropped product. Drop Destination mean old product and drop destination. Drop product-destination means drop product and drop destination.

Table A3-10: Descriptions and Sources of Variables.

Variable Name	Description	Sources
Export	HS 6-digit manufacturing, HS 6-digit non-manufacturing exports and HS 8-digit manufacturing export for Trinidad and Tobago, 1996-2009.	Central Statistical Office (CSO), Government of Trinidad and Tobago
LnGDP	Natural log of Gross Domestic Product (constant US$ 2005).	World Development Indicators of the World Bank (2010) and Penn World Tables (PWT 6.3).
CARICOM	Dummy variable equal to 1 if the export destination is a member of CARICOM and 0 otherwise.	Administrative Reports of the Ministry of Trade and Industry, Government of Trinidad and Tobago.
NonRecipPref	Dummy variable equal to 1 if Trinidad and Tobago enjoyed non-reciprocal preference in the export market and 0 otherwise.	Administrative Reports of the Ministry of Trade and Industry, Government of Trinidad and Tobago.
LnAvgTariff	Natural log of Average MFN tariff for manufactured goods.	World Development Indicators of the World Bank 2010 and WITS websites
WTO	Dummy variable equal to 1 if the export destination is a WTO member and 0 otherwise.	WTO website
DipMiss	Dummy Variable equal to one if Trinidad and Tobago has an Embassy or a Consulate in the export market and zero otherwise.	Administrative Reports of the Ministry of Foreign Affairs and Communication, Government of Trinidad and Tobago
Governance	Summary Index of Governance (include Voice Accountability, Political Stability, Government Effectiveness, Control of Corruption, Regulatory Quality and Rule of Law).	World Bank (2010) Worldwide Governance Indicators
LnDistance	Is the natural log of the bilateral distance of the export destination from Trinidad and Tobago.	CEPII (*Centre d'Estudes Prospectives et d'Informations*) website
Language	Dummy variable equal to 1 if export destination has similar language to Trinidad and Tobago.	CEPII (*Centre d'Estudes Prospectives et d'Informations*) website
Island	Dummy variable equal to 1 if export destination is an island.	CIA World Factbook
Landlocked	Dummy variable equal to 1 if export destination is landlocked.	CEPII (*Centre d'Estudes Prospectives et d'Informations*) website
Colony	Dummy variable equal to 1 if export destination and Trinidad and Tobago share colonial heritage.	CEPII (*Centre d'Estudes Prospectives et d'Informations*) website

Notes: *CARICOM* is defined to also include Venezuela, Columbia, Dominican Republic, Cuba and Costa Rica. Trinidad and Tobago by virtue of being a member of CARICOM enjoys reciprocal access to these markets as a result of bilateral arrangements these countries have signed with CARICOM. *NonRecipPref* captures Caribbean Basin Initiative Preferences (CBI) in the United States Market, CARIBCAN preferences in the Canadian market and Cotonou and EPA preferences in the European Union Countries.

Table A3-11: List of Trinidad and Tobago's Manufacturing Export Destinations.

AFGHANISTAN	CANADA	GRENADA	MALTA	SINGAPORE
ALBANIA	CAYMAN ISLANDS	GUADELOUPE	MARTINIQUE	SLOVAKIA
ALGERIA	CENTR. AFRICAN REP.	GUAM	MAURITANIA	SOLOMON ISLANDS
AMERICAN SAMOA	CHILE	GUATEMALA	MAURITIUS	SOUTH AFRICA
ANGOLA	CHINA	GUINEA	MEXICO	SPAIN
ANGUILLA	COLOMBIA	GUYANA	MONGOLIA	SRI LANKA
ANTIGUA AND BARBUDA	COMOROS	HAITI	MONTSERRAT	ST. KITTS AND NEVIS
ARGENTINA	CONGO	HONDURAS	MOROCCO	ST. LUCIA
ARMENIA	COSTA RICA	HONG KONG	MYANMAR	ST. PIERRE AND MIQUELON
ARUBA	COTE D'IVOIRE	ICELAND	NAMIBIA	ST. VINCENT
AUSTRALIA	CROATIA	INDIA	NETHERLANDS	SURINAME
AUSTRIA	CUBA	INDONESIA	NETHERLANDS ANTILLES	SVALBARD ISLANDS
AZERBAIJAN	CURACAO	IRAN	NEW ZEALAND	SWAZILAND
BAHAMAS	CYPRUS	IRELAND	NICARAGUA	SWEDEN
BAHRAIN	CZECHOSLOVAKIA	ISRAEL	NIGERIA	SWITZERLAND
BANGLADESH	DENMARK	ITALY	NORWAY	SYRIA
BARBADOS	DOMINICA	JAMAICA	OMAN	TAIWAN
BELARUS	DOMINICAN REP.	JAPAN	OTHER COUNTRIES	THAILAND
BELGIUM	ECUADOR	JORDAN	PAKISTAN	TOGO
BELIZE	EGYPT	KAZAKHSTAN	PANAMA	TUNISIA
BENIN	EL SALVADOR	KENYA	PARAGUAY	TURKEY
BERMUDA	EQUATORIAL GUINEA	KOREA, D. P. REP.	PERU	TURKMENISTAN
BOLIVIA	FAEROE ISLANDS	KOREA, REPUBLIC OF	PHILIPPINES	TURKS AND CAICOS ISL.
BOSNIA HERZEGOVINA	FINLAND	KUWAIT	POLAND	U. S. A.
BOTSWANA	FRANCE	LATVIA	PORTUGAL	U. S. VIRGIN ISLANDS
BOUVET ISLAND	FRENCH GUIANA	LEBANON	PUERTO RICO	UKRAINE
BRAZIL	FRENCH SOUTHERN TERRITORIES	LESOTHO	QATAR	UNITED ARAB EMIRATES
BRITISH IND. OC. TERR.	GABON	LIB ARAB JAMAHIRI	ROMANIA	UNITED KINGDOM
BRITISH VIRGIN ISLANDS	GAMBIA	LIBERIA	RUSSIAN FEDERATION	UNITED REP. OF TANZANIA
BRUNEI DARUSSALAM	GEORGIA	LUXEMBOURG	SAN MARINO	URUGUAY
BULGARIA	GERMANY	MACAU	SAO TOME AND PRINCIPE	US MINOR OUTLYING ISLANDS
BURUNDI	GHANA	MADAGASCAR	SAUDI ARABIA	VENEZUELA
CAMBODIA	GIBRALTAR	MALAYSIA	SENEGAL	VIET NAM
CAMEROON	GREECE	MALDIVES	SIERRA LEONE	YEMEN

Table A3-12: Summary Characteristics (1996-2003 sample).

Variable	Observations	Mean	Std. Dev.	Min	Max
Log Total Export	635	13.226	3.589	2.890	19.988
Log Extensive	635	2.416	1.999	0	6.655
Log Intensive	635	10.810	2.339	2.890	18.299
LnGDP	557	24.955	2.466	19.611	30.098
CARICOM	635	0.154	0.362	0	1
NonRecipPref	635	0.154	0.362	0	1
LnAvgTariff	488	2.293	0.628	0	4.327
WTO	635	0.857	0.351	0	1
DipMiss	635	0.405	0.491	0	1
Governance	572	0.394	0.882	-2.177	1.825
LnDistance	596	8.248	1.138	5.083	9.834
Language	635	0.370	0.483	0	1
Colony	635	0.307	0.462	0	1
Island	635	0.376	0.485	0	1
Landlocked	635	0.052	0.222	0	1

Table A3-13: Correlation Matrix between Log Extensive Margin and Explanatory Variables, (1996-2003 sample)

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
(1)Log Extensive	1												
(2)LnGDP	-0.446	1											
(3)CARICOM	0.766	-0.762	1										
(4)NonRecipPref	0.052	0.442	-0.244	1									
(5)LnAvgTariff	0.172	-0.336	0.366	-0.415	1								
(6)WTO	0.148	-0.045	0.084	0.086	-0.088	1							
(7)DipMiss	-0.171	0.553	-0.393	0.511	-0.195	0.169	1						
(8)Governance	0.192	0.186	0.012	0.610	-0.533	0.158	0.148	1					
(9)LnDistance	-0.770	0.697	-0.753	0.228	-0.359	-0.159	0.221	0.132	1				
(10)Language	0.533	-0.377	0.585	-0.071	0.178	0.124	-0.259	0.202	-0.346	1			
(11)Colony	0.435	-0.574	0.687	-0.312	0.348	0.107	-0.336	-0.089	-0.409	0.717	1		
(12)Island	0.415	-0.362	0.454	-0.215	0.086	0.089	-0.196	0.148	-0.339	0.498	0.384	1	
(13)Landlocked	-0.155	-0.006	-0.120	0.052	-0.158	-0.010	0.199	0.103	0.104	-0.160	-0.134	-0.147	1

Notes: The column numbers correspond to the row numbers.

Table A3-14: Correlation Matrix between Log Intensive Margin and Explanatory Variables (1996-2003 sample)

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
*(1)*Log Intensive	1												
(2)LnGDP	0.009	1											
(3)CARICOM	0.205	-0.762	1										
(4)NonRecipPref	0.017	0.442	-0.244	1									
(5)LnAvgTariff	0.071	-0.336	0.366	-0.415	1								
(6)WTO	0.081	-0.045	0.084	0.086	-0.088	1							
(7)DipMiss	0.076	0.553	-0.393	0.511	-0.195	0.169	1						
(8)Governance	-0.047	0.186	0.012	0.610	-0.533	0.158	0.148	1					
(9)LnDistance	-0.295	0.697	-0.753	0.228	-0.359	-0.159	0.221	0.132	1				
(10)Language	0.090	-0.377	0.585	-0.071	0.178	0.124	-0.259	0.202	-0.346	1			
(11)Colony	0.002	-0.574	0.687	-0.312	0.348	0.107	-0.336	-0.089	-0.409	0.717	1		
(12)Island	0.184	-0.362	0.454	-0.215	0.086	0.089	-0.196	0.148	-0.339	0.498	0.384	1	
(13)Landlocked	-0.199	-0.006	-0.120	0.052	-0.158	-0.010	0.199	0.103	0.104	-0.160	-0.134	-0.147	1

Notes: The column numbers correspond to the row numbers.

Table A3-15: Results of test for equality of the coefficient sizes on the intensive and extensive margins (based on regressions in Table 3.7).

	1996-2003		2004-2009	
VARIABLES	Test Statistic	p-value	Test Statistic	p-value
LnGDP	3.90	0.04	2.13	0.17
CARICOM	3.12	0.07	1.86	0.17
NonRecipPref	2.49	0.11	4.63	0.03
LnAvgTariff	0.01	0.92	0.04	0.83
WTO	0.37	0.54	5.18	0.02
DipMiss	4.11	0.04	3.89	0.04
Governance	6.36	0.01	9.88	0.00
LnDistance	3.57	0.05	7.17	0.00
Language	10.40	0.00	20.03	0.00
Island	3.92	0.04	0.79	0.37
Landlocked	6.85	0.00	3.89	0.04

Notes: For each of the samples, we estimate the regressions (column 2 and 3; and column 5 and 6 as in Table 3.7) using Seemingly Unrelated Regression. We then test the equality of the coefficient sizes on the extensive and the intensive margins for both samples and the results are presented in this table.

Table A3-16: OLS Estimation Results on the Determinants of Trade Margins with Colony and excluding CARICOM.

	1996-2003			2004-2009		
VARIABLES	(1) Log Total Exports	(2) Log Extensive	(3) Log Intensive	(4) Log Total Exports	(5) Log Extensive	(6) Log Intensive
LnGDP	0.644***	0.257***	0.386***	0.708***	0.280***	0.428***
	(0.0963)	(0.0378)	(0.0789)	(0.0845)	(0.0309)	(0.0761)
NonRecipPref	1.209***	0.995***	0.214	-0.295	0.367**	-0.663*
	(0.462)	(0.186)	(0.403)	(0.450)	(0.175)	(0.396)
LnAvgTariff	0.0403	0.0305	0.00974	-0.101	-0.0191	-0.0822
	(0.283)	(0.103)	(0.248)	(0.249)	(0.0858)	(0.233)
WTO	-0.150	-0.376*	0.226	2.061***	-1.137*	3.198***
	(0.658)	(0.222)	(0.582)	(0.466)	(0.615)	(0.880)
DipMiss	-0.563	-0.638***	0.0748	0.110	-0.283**	0.393
	(0.380)	(0.133)	(0.323)	(0.321)	(0.120)	(0.291)
Governance	0.0676	0.326***	-0.258	-0.250	0.213***	-0.463**
	(0.250)	(0.0804)	(0.215)	(0.222)	(0.0776)	(0.197)
LnDistance	-2.719***	-1.586***	-1.133***	-2.525***	-1.568***	-0.957***
	(0.153)	(0.0581)	(0.128)	(0.161)	(0.0504)	(0.144)
Language	1.012**	0.717***	0.295	0.342	0.889***	-0.547
	(0.418)	(0.161)	(0.380)	(0.378)	(0.138)	(0.336)
Island	1.319***	0.433***	0.885***	0.832**	0.308**	0.525*
	(0.395)	(0.126)	(0.335)	(0.353)	(0.122)	(0.313)
Landlocked	-1.257**	0.0160	-1.273**	-1.378**	-0.205	-1.173**
	(0.524)	(0.212)	(0.501)	(0.583)	(0.190)	(0.551)
Colony	-0.0622	0.541***	-0.603	0.620	0.457***	0.163
	(0.471)	(0.175)	(0.423)	(0.408)	(0.140)	(0.374)
Constant	18.46***	8.724***	9.740***	14.81***	8.967***	5.840***
	(2.209)	(0.785)	(1.887)	(1.921)	(0.953)	(1.900)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	No	No	No	No	No
Observations	487	487	487	453	453	453
R-squared	0.555	0.778	0.252	0.467	0.762	0.228

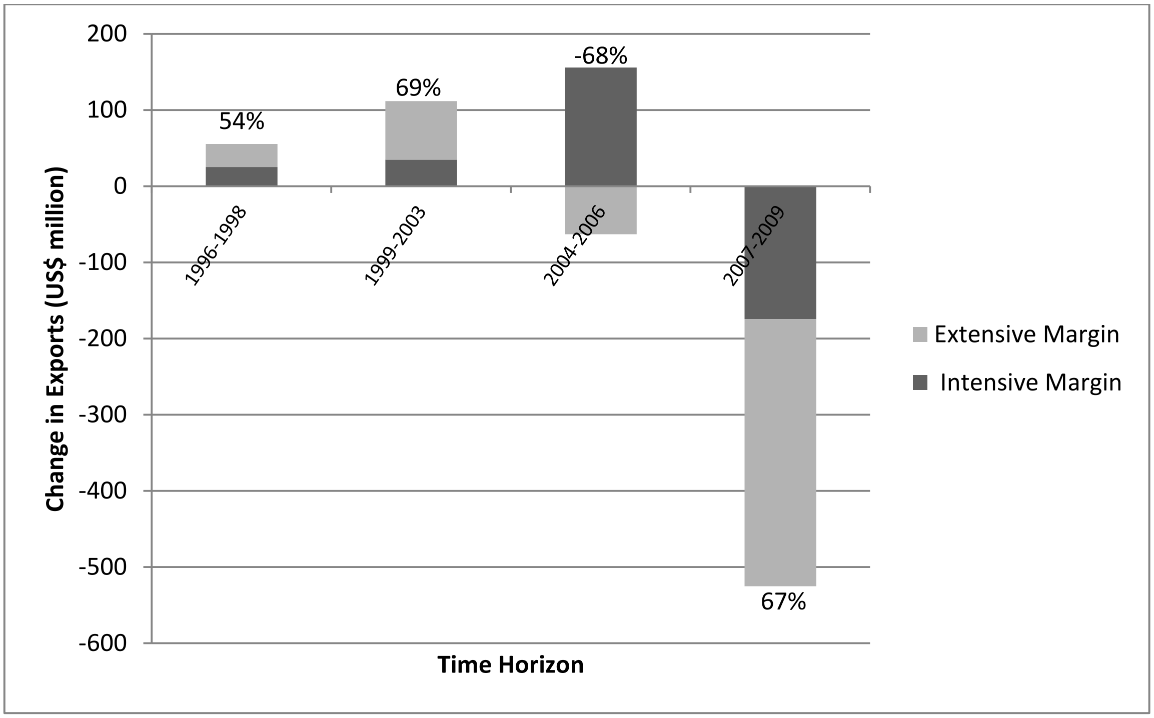
Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Table A3-17: Results of Fixed Effect Model on the Determinants of Trade Margins using country specific fixed effects.

	1996-2003			2004-2009		
VARIABLES	(1) Log Total Exports	(2) Log Extensive	(3) Log Intensive	(4) Log Total Exports	(5) Log Extensive	(6) Log Intensive
LnGDP	4.061*	1.115**	2.945	-1.524	0.527	-2.051
	(2.082)	(0.557)	(1.941)	(2.095)	(0.690)	(2.020)
NonRecipPref				-7.362**	1.404	-8.766***
				(3.403)	(1.014)	(3.231)
LnAvgTariff	0.211	0.0171	0.193	0.137	-0.399	0.536
	(0.463)	(0.113)	(0.470)	(1.052)	(0.324)	(1.016)
WTO	1.504	0.0460	1.458	2.137	-1.328	3.465**
	(0.976)	(0.331)	(0.945)	(1.873)	(0.811)	(1.671)
DipMiss				2.335**	-0.173	2.508**
				(1.064)	(0.153)	(0.971)
Governance	0.820	-0.124	0.945*	1.738	-0.789**	2.526**
	(0.500)	(0.147)	(0.500)	(1.293)	(0.378)	(1.264)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	487	487	487	453	453	453
R-squared	0.807	0.951	0.603	0.768	0.932	0.623

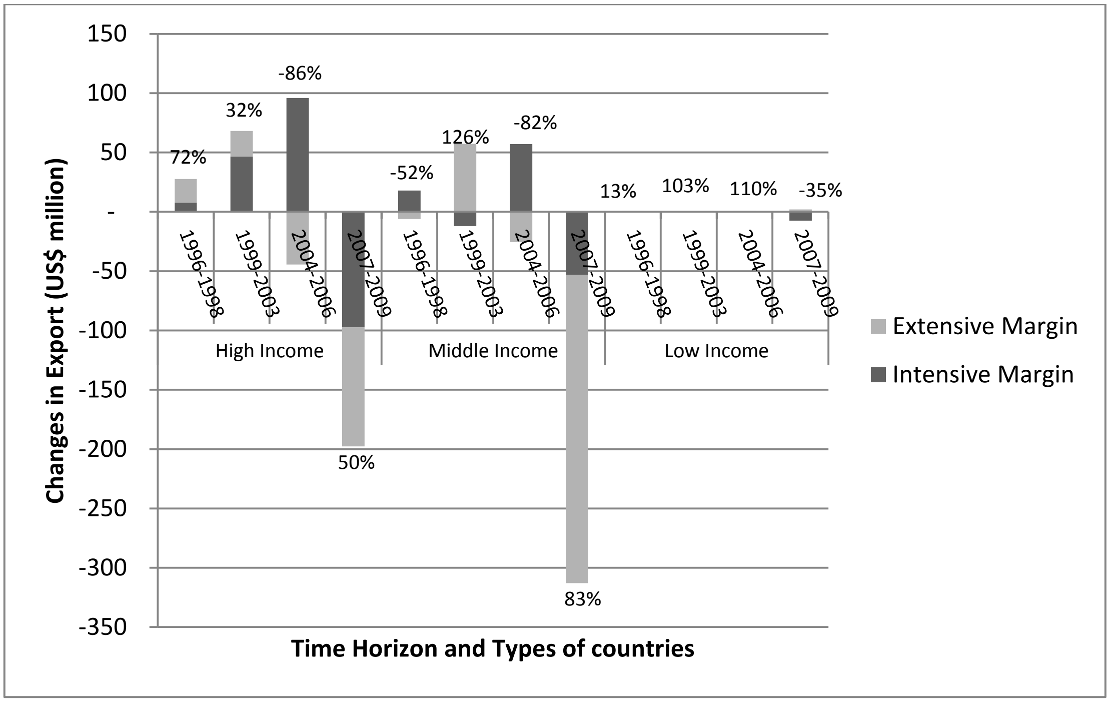
Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1. Omitted variables indicate that there is no variation in the specific variable in the associated sample period.

Figure A3-1: Decomposition of Trinidad and Tobago's Export Growth for Manufactured Goods to all countries (HS 8-digit).



Note: Numbers at the end of each bar represent percentage contribution of the extensive margin. The extensive and the intensive margins sum to 100%.

Figure A3-2: Decomposition of Trinidad and Tobago's Export Growth for Manufactured Goods to different types of countries (HS 8-digit).



Note: Numbers at the end of each bar represent percentage contribution of the extensive margin. The extensive and intensive margins sum to 100%.

Chapter 4
Death or Survival: Explaining Export Duration in a Small Industralising Economy

4.1 Introduction

For quite a long time the issue of trade duration (along with its determinants) has been overlooked in both the theoretical and empirical international trade literature.[1] However, since the seminal work of Besedeš and Prusa (2006a), this issue has become a newly emerging focus in the study of international trade and the literature has flourished. The primary reason accounting for the growth in this literature is the increasing recognition of the importance of export duration for long term export growth as well as for trade policy formulation. Another reason for the growth in the literature is the increasing availability of disaggregated country and firm-level data. Notwithstanding the growing empirical literature on trade survival, much of the existing studies have focussed on developed countries and the larger emerging economies. This situation is constraining as policy conclusions drawn from developed countries and larger emerging economies may not be appropriate for smaller developing countries. In this regard, our work seeks to fill a gap in the existing literature by examining the issue of export duration in the context of a small developing country. We look at Trinidad and Tobago's manufacturing exports for the period 1996-2009. In this regard, this chapter has two main objectives. The first objective is to measure and highlight stylized facts on Trinidad and Tobago's export duration; and, more importantly, the second objective is to examine the factors (including policy and institutional factors) influencing export

[1] Empirical trade researchers have devoted considerable time to establishing methods to deal with zeros in the trade matrix. The zeros have been interpreted in their own right, especially the question of what makes countries start to trade. However, much less attention has been devoted to the question of what makes countries stop trading. That is, what influences the time taken to switch from a positive trade flow to zero (trade duration).

duration and to provide some policy implications for Trinidad and Tobago to maintain stable export growth.

The issue of export duration is of fundamental importance, especially for export expansion in developing countries. It is increasingly recognized that export growth could be enhanced not only by expansion along the intensive margin (exporting more of existing export products to existing export markets) and the extensive margin (exporting more new products and/or exporting to new markets); but by having fewer failures of exports i.e the sustainability margin (Besedeš and Prusa, 2010; Besedeš, and Prusa, 2011; Cadot et al., 2013; Stirbat et al., 2011; Kamuganga, 2012). Indeed, several empirical studies have highlighted the importance of export survival in the context of developing countries. For example, empirical work by Besedeš and Blyde (2010) has shown that differences in export survival rates between Latin America and Asia generate large differences in export growth over the long run. They argue that the main reason for the lack of export growth in developing countries is not necessarily the failure to discover new activities, but rather, the inability to maintain export relationships. They note that there is an abundance of evidence describing new export attempts in developing countries that fail to survive after a few years of service (see Inter-American Development Bank, 2007; Agosin and Bravo-Ortega, 2009). Similarly, Besedeš and Prusa (2011) in another important empirical study find fairly small differences in survival rates between South Korea and Central American countries have resulted in significant differences in long run export growth. For the period 1975-2003, using counterfactual exercises, they show that if Central American countries had the superior export survival rates as South Korea, their exports would have been 50% larger than what they actually achieved by 2003. Moreover, for Caribbean countries, they show that the long-run impact on export growth of having South Korea's superior export survival rates would have been even greater than in the case of Central American countries. In general, they argue that developing countries would experience significantly higher export growth if their survival rates were improved. Thus, improving survival rates should be a key component of the export strategy for developing countries. Also, Hess and Persson (2011) argue that trade will not grow very much if new products stop being exported after only a few years. They contend that to better understand which factors may help countries increase their trade, and thereby potentially improve economic development; it is important to learn more about what determines the duration of trade flows. Given that export diversification and growth are popular development objectives in many developing countries, the issue of export survival undoubtedly is of tremendous interest.

The issue of export duration also holds special importance for developing countries in terms of both trade and economic policy formulation. In the design of export promotion strategies, knowledge of policy related determinants of export survival will be important. In this regard, a better understanding of which products are most likely to endure in foreign markets and which factors encourage sustainable export relationships will be useful. Policy makers armed with these insights, for example, could design more effective export promotion strategies by identifying products and target markets most likely to result in future success stories (Brenton et al., 2009; Nicita et al., 2011; Stirbat et al., 2011). Also, firms contemplating investment options could also benefit from having information on export survival. Indeed, this information could prove useful in determining which products and/or which markets to invest in. In addition, trade survival is important because of its possible effects on the macroeconomy. As Shao et al. (2012) argue, frequent entry to and exits from export markets can lead to trade volatility which could have negative effects on the macroeconomy. What seems clear is that the issue of export survival is especially important for developing countries not only in terms of export growth and but in terms of both trade and economic policy formulation.

The remainder of the chapter is organized as follows. Section 2 reviews and evaluates the relevant theoretical and empirical literature on export duration and its determinants. Section 3 examines how export duration has been measured in existing empirical studies and some of the data measument issues invloved. Section 4 presents some descriptive statistics and stylized facts on Trinidad and Tobago's export duration. Section 5 discusses the empirical specification used to explain export duration. Section 6 describes our data and looks at the sample characteristics. Section 7 explains our econometric estimation strategy and issues. Section 8, presents and analyses our empirical results and discusses some robustness checks. The chapter concludes in Section 9.

4.2 The Relevant Literature

This section reviews both the theoretical and empirical literature on the measurement and determinants of export duration. We conclude the section with an evaluation of the existing literature. This evaluation forms part of the motivation for undertaking this research.

4.2.1 The Theoretical Literature

For many years the issue of trade duration has not being addressed in trade models. Despite the recent increase in empirical literature looking at the issue, there is still no established theory on trade survival. In most traditional models of international trade, explicit considerations of duration of trade are normally absent. The implicit assumption is that once a trade pattern is established, it will last for a long time. Thus, these traditional models seem incapable of explaining the existence of short trade duration, a result which seems to be the consensus in several empirical papers (see Besedeš and

Prusa, 2006a and 2006b; Shao et al., 2012). For example, the classical Heckscher-Ohlin theory predicts little change in trade duration since from this perspective trade pattern is completely determined by factor endowment differences; and endowments change gradually. The idea is that once a country develops a comparative advantage in a particular product, that advantage should last. This suggests that once two countries begin to trade a particular product, the relationship is likely to persist, as endowments are rarely subjected to large shocks. The classical theory thus predicts that trade patterns and the duration of trade are expected to evolve slowly. In addition, the classical trade theory explains trade in broad categories of goods or broad industries while the duration literature focus on products. Also**,** the increasing returns model presented by the early work of Krugman (1979) does not address the issue of trade duration either. Moreover, recent developments in trade theory, for example the new-new trade theory pioneered by Melitz (2003), have been focused on heterogeneous firms, entry into exporting and how reduction in trade costs reallocate resources to exporters with high level productivity. There has been little attention as to why entering firms may cease exporting. However, implicit in Melitz (2003) trade relationships will be relatively long lived; once a firm makes its sunk cost investment to export, the ongoing cost of servicing a foreign market is modest; and once relationships are established they tend to be robust (Besedeš and Prusa, 2010). The product-cycle theory by Vernon (1966) provides some insight into how trade patterns evolve over time, yet this model is unable to explain the very short trade duration which seem evident from most empirical studies. In this model, technological leaders develop and export a product until others learn to manufacture it and enter the market. As technology becomes more standardized, other countries will begin to produce and export the product. If follower countries have relatively low labour costs, they eventually take over the market and push out leaders. This model implies that trade dynamics evolve either slowly or in a logical progression from developed countries to developing countries (Besedeš and Prusa, 2006a).

What seems evident from the foregoing analysis is that the standard trade models either have not addressed the issue of export duration directly or seem in capable of explaining the empirical reality of short export duration. However, although there is no established theory on trade survival, some studies have presented illuminating explanations on this issue. These focus on the following issues: uncertainty and imperfect information, product differentiation and hysteresis in trade models.

Uncertainty and Imperfect Information

In a prominent theoretical contribution Rauch and Watson (2003) explored the duration of trade relationships through a search model based on uncertainty. With a three stages search cost model, Rauch and Watson (2003) look at trade duration from the perspective of buyers in developed country markets where there is some uncertainty concerning the capability of their developing country suppliers. Their model proceeds in three stages: search, investment and rematch. In the first stage the buyer searches over a large pool of foreign suppliers with different production costs. After paying a search cost and being matched with a foreign supplier, the buyer immediately observes the supplier's cost, yet is still uncertain about whether the supplier is able to deliver large orders. In the second stage the buyer decides whether to make a lump-sum investment with the supplier. If the supplier turns out to be reliable, the lump-sum investment means a large surplus will be earned immediately. If the supplier turns out to be unreliable, the lump-sum investment is lost and the buyer must search again. As an alternative to the buyer making a lump-sum investment, the supplier’s reliability can be learned over time via small orders which yield zero surpluses. If the supplier proves to be reliable, the buyer makes the investment necessary for a large order and places a large order. In the third stage, the buyer has the option of continuing a supplier relationship or searching for a new supplier. So, there are three possible actions for the buyer: start big (invest immediately), start small (learn), or reject the supplier, which evidently indicates that trade relationship is more dynamic than predicted by classical trade theory. This model predicts that all else equal (1) relationships starting with large orders will have longer duration; (2) a decrease in investment costs increases the probability of a relationship starting large; and (3) a decrease in search costs increases the likelihood the buyer will opt to switch to a new supplier. Notably, Besedeš (2008) looking at US imports from developing countries over the period 1972-1988 finds strong support for the theoretical predictions of the Rauch and Watson (2003) model. Indeed, he finds that duration increases with the initial value of exports. Also, Iacovone and Javorcik (2010) looking at Mexican exports over the period 1994-2003 find compelling evidence in support of the theoretical predictions of the Rauch and Watson (2003) model.

Some authors explain duration pattern based on the fact that exporting firms lack information on costs. For instance, Brenton et al. (2009) argue that a firm deciding to export should get full information about the export market and its fixed cost as well. They argue, if firms have less than perfect information about the fixed costs of exporting a product to a particular market or there is some uncertainty about the value of these costs, then firms with relatively low productivity that are marginal entrants into exporting may subsequently find they are unable to survive. They argue, in the absence of full market information, that firms may use entry as a mechanism for discovering the exact nature of the costs of exporting to that market and withdraw if it is found to be not profitable to incur fixed costs of exporting. In this case they argue initial entry is likely to take place on a small scale and exit is likely to be prevalent, thus rendering duration in export markets short. They contend that when information on the costs of exporting is well known or can be obtained at little cost you are more likely to observe entry on a larger scale and exit after a short period should be less frequent. They note that such information is likely to be more easily obtained the greater the presence of exporters of other products to the particular export market and the greater the overall experience in exporting the specific product.

In line with the theoretical arguments advanced by Brenton et al. (2009), Besedes and Prusa (2011) highlight the role of uncertainty and imperfect information in explaining export duration. They propose a model of trade based on the seminal work of Melitz (2003) extended by Segura-Cayuela and Vilarrubia (2008b). In their model, firms incur a one-time sunk cost to enter export markets as well as a per period destination-market-specific fixed cost in order to maintain a presence in a foreign market. They argue that while a firm may have a clear idea of its home market conditions and its costs of production, it may not know the level of demand abroad and/or have all the information about ongoing costs associated with exporting. They note that imperfect information may lead a firm to start exporting to a destination market but soon thereafter find it optimal to cease exporting. They argue the fact that uncertainty about costs of servicing an export market is only resolved after the firm has started exporting means that you will potentially observe a significant amount of entry, exit and churning. The model implies that a country whose firms face greater uncertainty will have shorter export duration.

Other authors explain trade duration in terms of credibility and the quality of contract enforcement (Araujo and Ornelas, 2007; Brenton el al., 2009; Aeberhardt et al., 2012; Araujo et al., 2012). For example Araujo and Ornelas (2007) and Araujo et al. (2012) argue that potential exporters look for partnerships with distributors in overseas markets but a weak institutional environment allows some distributors with little concern for the future to behave opportunistically and to default. In such a climate, forward looking distributors seek to differentiate themselves from myopic distributors by building a reputation over time. Hence, informational costs decline as exporting experience is accumulated. They note that initial export flows will be small but increase over time as the exporter becomes better aware of the trustworthiness of the distributor and the probability that they will default on the contract in the future. Hence, the probability of exit from exporting declines the longer the partnership with the distributor continues. Improvements in the institutions for contract enforcement have a direct and positive effect on exports by reducing uncertainty and improving the expected return of the exporter. Indeed, they argue that better institutions make contractual defaults more difficult and this increases both the longevity of partnerships and makes producers more confident about the workings of their partnerships and this in turn induces them to start with higher volumes. Also, since opportunistic agents are more constrained in those environments, their relationships last longer. Araujo et al. (2012) tested their theoretical model using data for Belgian exporting firms over the period 1995-2008. They find evidence that all else equal, exporters start their activities with higher volumes and remain as exporters for a longer period in countries with better contracting institutions. They also find that, conditional on survival, the growth rate of a firm's exports to a country decreases with the quality of the country's institutions. Moreover, in a related theoretical model, Aeberhardt et al. (2012) argue that firms that want to start exporting to a specific country have to search for a partner in that destination. They note that if an exporter is matched with an importer, she is initially uncertain about the importer's reliability. They indicate that contracts are incomplete, so that some partners may try to hold-up the exporter. They argue that whether an importer has incentives to do so depend on the value of short terms gains from holding up the partner relative to the value of maintaining a long term relationship. This they note depends, among other things, on the exporter's productivity, the importer's type (patient or impatient), the extent of sectoral contracting frictions and the quality of legal institutions in the destination country. On the one hard, they argue that patient importers sufficiently value future profits from any relationship to respect contracts with all exporters. On the other hand, they argue that impatient importers try to renegotiate contracts *ex post* if contracting frictions are severe, legal institutions are weak and exporters are relatively unproductive. They note that since exporters have to learn their partners' type through experience, uncertainty is initially large and thus export values are small. As an exporter observes that the contract is respected she becomes more confident that her partner is reliable and the value of exports grows. In support of their theoretical model, Aeberhardt et al. (2012) find evidence using French firm level data for the period 1993-2005 that hazard rates are negatively correlated with the destination countries' legal quality and decline with the age of relationships as unreliable export partners are weeded out.

Product Differentiation

Another strand of theoretical work looks at how survival rates vary with product type. Rauch (1996) and Rauch (1999) discuss the role of trading networks in the presence of uncertainty by dividing goods into: homogenous, reference-price and differentiated goods. Homogenous goods are defined as goods that are not traded in organized exchanges but have a reference price (for instance quoted in a trade publication). Referenced priced goods refer to goods that are traded on organized exchanged markets and involve specialized traders that centralize prices. Finally, differentiated goods are "branded goods". Rauch (1999) argues that, because homogeneous goods are sold on organized markets, the search cost the buyer is required to pay in order to find an appropriate supplier is minimized. He argues that because differentiated goods are not sold on organized markets, the search costs will be considerably higher as buyers have to go out and find appropriate suppliers. Thus, the matching of exporters and buyers will tend to be harder for differentiated goods than for homogenous goods. Indeed, Rauch (1999) presents evidence that search costs are higher and matching more difficult for differentiated goods. One key implication of this model is that the duration of relationships involving differentiated goods is longer than those involving homogenous goods (see Besedeš and Prusa, 2006b).[2] Some of the key theoretical predictions of the Rauch model of product differentiation were confirmed by empirical work by Besedeš and Prusa (2006b) using United States import data for the period 1972-1988. Indeed,

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[2] Fugazzza and Molina (2011) argue that trade relationships based on differentiated goods will exhibit longer duration as they face lower competition.

they find strong evidence that duration of trade relationships is longer for differentiated goods than for homogenous goods.

Hysteresis in Trade Models

Another possible explanation for trade stability (i.e. persistence of export status) goes back to the hysteresis trade literature (see Baldwin and Krugman, 1989; Baldwin, 1988; Baldwin, 1990). Inspired by the effects of the dollar overvaluation between 1980 and 1985, these models explain the persistence (i.e. hysteresis) of firms' export participation as a consequence of the sunk costs associated with the entry into new markets. Following the dollar appreciation, foreign firms entered the United States market (while United States firms exited some markets), but since they incurred entry costs they did not necessarily exit once the exchange rate went back to its initial value. This arises because market entry is generally costly: firms have to meet market-specific standards and regulations, adapt their packaging, establish distribution channels, accumulate information about foreign markets, etc. In general, the central idea in these models is that in the presence of sunk market entry costs, large exchange rate shocks lead to entry of new firms to markets which then do not exit after the shocks have passed because firms have invested in marketing, research and development, reputation and distribution networks. Thus, firms tend to serve export markets over relatively over long periods of time. Thus, these models emphasize the role of entry fixed costs as key determinants of firms export status and persistence (duration).

4.2.2 The Empirical Literature

Notwithstanding the fact that duration analysis has been used in other areas of economics such as labour economics to study unemployment and strike durations as well as in other professions (such as engineering, medicine and sociology), application of duration analysis to trade data is a relatively new phenomenon, pioneered by the work of Besedeš and Prusa (2006a). Since the seminal contribution of Besedeš and Prusa (2006a), trade duration has become a newly emerging focus in the study of international trade. In this subsection we discuss the following: (1) the coverage of the empirical literature and some initial results on the measurement of trade duration; (2) the model specifications and preferred estimation techniques previous empirical studies use; and (3) the results of empirical estimations of the determinants of the hazard rate.

Coverage and Summary results of Previous Studies

The empirical literature on the duration of trade is still very much incipient. Despite recent interest in the subject, empirical work in the area remains relatively limited. Table 4.1 presents the coverage of the main empirical papers on duration of trade.

Table 4.1: Coverage of the Empirical Literature on the Measurement and Determination of Trade Duration.

No.	Study	Time Period	Aim of Study	Countries	Nature of Data	Summary Results on the Measurement of Trade Duration
1	Besedeš and Prusa (2006a)	1972-1988	Measuring US import duration	US imports from over 160 partners	Import, 7-digit Tariff Schedule	US import duration is short. The median duration of importing a product to the US is 2-4 years.
2	Besedeš and Prusa (2006b)	1972-1988	Role of product differentiation in export duration	US imports from over 160 partners	Import, 7-digit Tariff Schedule	The median survival times are extraordinarily short: 5 years for differentiated products and 2 years for reference priced and homogenous goods. One half of the trade relationships involving reference priced and homogenous goods fail during the first 2 years.
3	Obashi (2008)	1993-2006	Measurement and determination of export duration	9 Asian Countries	Export, HS 6-digit	Short-lived trade relationships are prevalent especially for final products. For final products 57% of the trade relationships last at most 2 years, while for parts and components 44% of the relationships last at most 2 years.
4	Besedeš (2008)	1972-1988	Role of search cost on export duration	US imports from over 160 partners	Import, 7-digit Tariff Schedule	The incidence and duration of US import is consistent with the Rauch and Watson (2003) search cost perspective of trade. Imports with larger initial values have longer duration.
5	Nitsch (2009)	1995-2005	Determinants of German import duration	Germany	Import, 8-digit Combined Nomenclature (CN)	The average trade relationship last about 3 years with a median duration of 2 yrs. That is, the vast majority of German import trade appear short-lived.
6	Brenton et al. (2009)	1985-2005	What explains the low survival rates of Developing countries	82 exporting countries	Export 5-digit SITC	Approximately 33% of flows survive the first 5 yrs. Countries at higher stage of development have survival times.
7	Volpe-Martincus and Carballo (2009)	2000-2006	Measurement and determinants of export duration.	Peru	Firm export, 10-digit HS	While less than 50% of the firms exporting to one country survive from the first year to the second year, almost 75% of the firms exporting to two countries do so.
8	Besedeš and Blyde (2010)	1975-2005	Measurement and determinants of export duration.	47 exporting countries	Export, 4-digit SITC (manufactured goods)	Export relationships are in general brief. The median length of spell for the US is 2 years and only 1 for other regions. While in the US 61% of trade relationships survive the first year, in Latin America it is even lower (47%).

continued

Table 4.1 continued

No.	Study	Time Period	Aim of Study	Countries	Nature of Data	Summary Results on the Measurement of Trade Duration
9	Hess and Persson (2011)	1962-2006	Determinants of import duration in the EU	15 EU countries importing from 140 countries	Import, 4-digit SITC	EU imports very short lived. 60% of all spells cease during the first year of service.
10	Fugazza and Molina (2011)	1995-2004	Determinants of export duration	96 countries	Export, HS 6-digit	Export relationships are short. One and two year old relationships account for at least one third of the total number of trade relations.
11	Besedeš and Prusa (2011)	1975-2003	Impact of export survival on export growth	46 countries	Export, 4-digit SITC (manufactured goods)	Export duration is remarkably brief. The median survival time is 1 to 2 years in all regions. With 50% of all export relationships failing within the first two years. Small differences in survival rates between countries create significant differences in long-run export growth.
12	Besedeš (2012)	1990-2007	Role of NAFTA and returns to scale in export duration	Canada, Mexico and US	Export, HS 6-digit	Intra NAFTA exports enjoy a lower hazard relative to exports to non-members. Exports of increasing returns to scale manufacturing products face the highest hazard in the case of Canada and Mexico.
13	Shao et al.(2012)	1995-2007	Measurement and the determinants of export duration	China	Export, HS 6-digit, manufactured goods	Export duration relatively short, with mean and median of 2.87 and 2 years, respectively. Approximately 50% of the export relationships end within 2 years.

It is immediately evident from Table 4.1 above that the literature on trade duration is of recent vintage. Indeed, Besedeš and Prusa (2006a) represent the first published work in the area. Further, it is evident that most studies have looked at time periods of at least 10 years. For example, Besedeš and Prusa (2006a) and Besedeš and Prusa (2006b) conduct their studies over the period 1972-1988 (17 years). Likewise, Brenton et al. (2009) conduct their study over the period 1985-2005 (21years) and Hess and Persson (2011) conduct their study over the period 1962-2006 (45 years). A notable exception in this regard is Volpe-Martincus and Carballo (2009) whose study looks at the period 2000-2006 (7 years). In the case of this latter study, they use firm-level data. Moreover, since the initial work of Besedeš and Prusa (2006a), that focused solely on the measurement of trade duration, several of the subsequent studies focused not solely on the measurement of trade duration, but on its key determinants. For instance, Besedeš and Prusa (2006b) examine the role of product differentiation on export duration and Besedeš (2012) looks at the role of NAFTA and returns to scale in explaining export duration. In general, most of the other studies aim at both the measurement and determinants of export duration (for example Obashi, 2008; Shao et al., 2012). In addition, it is evident that most single country studies tend to focus on industrialized countries. To illustrate, Besedeš and Prusa (2006a) and Besedeš and Prusa (2006b) conduct their studies on the United States, Nitsch (2009) conducts his study on Germany and Shao et al. (2012) on China. Further, with the exception of studies by Besedeš and Blyde (2010), Hess and Persson (2011) and Besedeš and Prusa (2011) which use data at the 4-digit level, most studies use data aggregation of at least the 5-digit level. The reason for this is that trade duration analysis is sensitive to the level of aggregation of the data in that; trade duration is increased the more aggregated the data one uses. This occurs because if the data is too highly aggregated, very little product entry and exit will be observed. In this regard, Besedeš and Prusa (2006a) and Besedeš and Prusa (2006b) use data at the 7-digit level and Nitch (2009) uses data at the 8-digit level. Moreover, with regard to the type of data, studies have used both import and export data. Further, a few recent papers, for example Volpe-Martincus and Carballo (2009), have made use of the growing availability of firm-level datasets to shed light on the determinants of export duration. Other studies (not included in Table 4.1) making use of firm-level data include the following: Gorg et al. (2008), Murakozy and Bekes (2009), Tovar and Martinez (2011), Stirbat et al. (2011), Wagner (2011), Esteve-Perez et al. (2013) and Cadot et al. (2013).

Turning to the results of the studies measuring export duration, most of the studies have found the duration of trade relationships quite short. For example, Besedeš and Prusa (2006a) in their seminal work for the period 1972-1988 find the duration of US imports is rather short lived with a median duration of 2-4 years and 67% of trade relationships lasting only one year. Likewise, Nitsch (2009) looking at German imports for the period

1995-2005 find that the average trade relationship lasted about 3 years with a median duration of 2 yrs. Similarly, Hess and Persson (2011) analyse import duration of 15 EU countries over the period 1962-2006, and find the duration to be very short. Indeed, they find that 60% of all spells cease during the first year of service. Also, Fugazza and Molina (2011) looking at the exports from 96 countries find that in general export relationships are short. They find that one and two year old relationships account for at least one third of the total number of trade relations.

Model Specifications and Preferred Estimation Strategy used in Previous Studies

Studies in general use a wide array of control variables to examine the determinants of the hazard rate of export duration. Table 4.2 presents the specifications and preferred estimation strategy used to determine the hazard of trade relationship.

Table 4.2: Specification and Preferred Estimation Strategy used in Empirical Studies

Study No. (as in Table 4.1)	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**13**	**Expected sign**
List of Independent Variables												
Log GDPi	X		X	X				X	X			neg
Log GDPj								X	X	X	X	neg
Log (GDPi*GDPj)					X		X					neg
Log GDP per capita of country i			X	X								neg
Log GDP per capita of country j											X	neg
Log Distance		X	X	X	X		X	X	X	X	X	pos
Common Language (Official)		X	X	X	X		X	X	X	X		neg
Common Language (Minority)										X		neg
Common Border		X	X	X	X		X		X			neg
Common Colony					X			X	X	X		neg
Landlocked									X		X	pos
Neighbour dummy (=1, if product exported to neighbouring country)					X						X	neg
Log total import value of country i				X				X				neg
Log total export of country i				X	X							neg
Log total exports in industry by country j					X							neg
Log total exports of the product to all other countries in first year					X							neg
Log total imports of the product from all other countries in first year					X							neg
Log Initial Export Value		X			X	X	X		X	X	X	neg
Log Initial Import Value			X	X				X				neg
Log unit value of import				X							X	neg
Log number of export products				X		X		X		X		neg
Log number of export markets						X		X		X		neg
Log number of exporters				X								neg
Coefficient of variation of unit values for each HS product in country j in each year	X									X		pos
Differentiated Goods								X	X		X	neg
Homogenous Goods	X								X			pos
Reference price products	X											pos
Agricultural Goods	X		X									pos
Parts and Components		X	X								X	neg
Finished Products											X	neg
Exporter LDC								X				pos

continued

Table 4.2 continued

Study No. (as in Table 4.1)	2	3	4	5	6	7	8	9	10	12	13	Expected sign
Multiple spells	X	X	X		X				X		X	pos/neg
Frequent breaks dummy		X										pos
Business (time)									X			pos
Export costs(time)									X			pos
Import Costs(time)									X			pos
Average tariff in country j	X											pos/neg
Log transport costs to move products from country i to j	X		X				X					pos
Exchange Rate Misalignment					X		X					neg
Foreign Exchange Volatility	X		X	X	X			X	X		X	pos
PTA Dummy					X		X					neg
EU Member Dummy				X				X				neg
EMU Dummy				X								neg
WTO Member Dummy											X	neg
Country j is a NAFTA Member										X		neg
NAFTA Dummy (=1 in NAFTA years)										X		neg
Log elasticity of import demand in country j							X					pos
Log Financial Development in country i							X					neg
Rule of Law index in country i							X					neg
Increasing Returns to Scale in Manufacturing										X		neg
Increasing Returns to Scale in Natural Resources										X		neg
Firm Employment						X						neg
Firm Age						X						neg
Preferred Estimation Technique												
Simple Cox PH Model	X					X	X					
Stratified Cox PH		X	X	X					X		X	
Probit								X		X		
Cloglog					X							

Note: Country i represent exporter countries and country j represents importer countries. Also, continuous time approaches are Simple Cox PH and the Stratified Cox PH Model. The Weibull and the Exponential Model (not included in the table) are also continuous models. Discrete time approaches include probit and cloglog models. The logit model is also included in this category. Also, neg indicates negative sign and pos indicate positive sign on the associated coefficients.

From Table 4.2, it is evident that most studies model the hazard of a trade relationship as broadly influenced by the following factors: One, gravity type covariates such as GDP (in logs), distance (in logs), whether landlocked, sharing a common border, common language, common colonial status and membership of trade agreements. Two, product characteristics where products are classified according to their degree of differentiation: reference priced goods, homogenous products and differentiated products (see Rauch, 1996 and 1999; Besedeš and Prusa, 2006b; Fugazza and Molina, 2011). Some studies also include dummy variables to capture products that are parts and component, finish products and agricultural goods. Three, trade cost variables such as time required to export, time to import, average tariff and transport cost. Four, spell characteristics such as multiple spells, initial export value (at start of spell) and initial import value (at start of spell).

In terms of the gravity type covariates, studies in general control for economic size by either including some variable to capture GDP and / or GDP per capita. To illustrate, studies 2, 4, 5, 9 and 10 include GDP of exporters. Likewise, studies 9, 10, 12 and 13 include GDP of export destinations in their specifications. Also, studies 6 and 8 include the product of the GDP the importer and exporter in their specifications. In addition, all studies, with the exception of study 2 and 7 control for distance in their specifications. Likewise, all studies with the exception of study 2, 7 and 13 include the sharing of common language (official) by trading partners in their specifications. Also, studies 3, 4, 5, 6, 8 and 10 control for a common border. Further, studies 6, 9, 10 and 12 control for a shared colonial history. Finally, a few studies control for common membership of trade agreements. For example, studies 6 and 8 control for PTA membership, studies 5 and 9 control for EU membership and study 12 controls for membership in NAFTA. Moreover, with regard to product characteristics, studies 9, 10 and 13 control for differentiated goods, while study 2 and 10 control for homogenous goods and study 2 controls for referenced price products. Further, with regard to the trade cost variables, study 10 includes both time to import and time to export in their model specification. The average tariff in the export destination is included in study 2, while study 2, 4 and 8 control for transport costs to the export destination. Finally, with respect to spell characteristics, several studies control for the initial export and import value in the first year of the respective spell. For instance, studies 3, 6, 7, 8, 10, 12 and 13 control for initial export value, while study 4, 5 and 9 controls for initial import value. In addition, several studies (2, 3, 4, 6, 10 and 13) control for multiple spells.

Turning our attention to the preferred estimation technique the various studies use, studies employ both the continuous time (Simple Cox PH Model and Stratified Cox PH Model) and the discrete time approaches (probit and cloglog model) to estimate the hazard rate, with the continuous time models being used more often than the discrete time ones. To illustrate, studies 2, 7 and 8 use the Simple Cox PH Model and studies 3, 4 5, 10 and 13 use the Stratified Cox PH Model as their preferred empirical model. In terms of the discrete time approach, studies 9 and 12 use the probit technique and study 6 uses the complementary log-log (cloglog) model.[3] The different data structures for the continuous time and the discrete time approaches are shown in Table A4-1 and Table A4-2 in the appendix, respectively.

Results of Empirical Estimations of the Hazard Rate from Previous Studies

A summary of results of empirical estimations of the factors influencing the hazard rate is shown in the table which follows.

[3] The cloglog model represents is a discrete time approximation to the Cox PH model. The coefficients obtained from this model are directly comparable to those obtained from the simple Cox PH Model.

Table 4.3: Summary Results of Empirical Studies Testing the Determinants of the Hazard Rate

Study (No. as in Table 4.1 and Table 4.2)	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**13**	**Expected sign**
List of independent variables												
GDPi	neg ***		neg ***	neg ***				neg (nr)	neg ***		neg ***	neg
GDPj								neg (nr)	neg ***	neg ***		neg
GDPi*GDPj					neg ***		neg ***					neg
GDP per capita of country i			neg ***	pos ***							neg ***	neg
GDP per capita of country j												neg
Distance		pos **	pos ***	pos ***	pos ***		pos ***	pos (nr)	pos ***	pos ***	pos ***	pos
Common Language (Official)		neg **	neg ***	neg ***	neg ***		neg ***	neg (nr)	neg ***	neg ***		neg
Common Language (Minority)										neg **		neg
Common Border		neg (ns)	neg ***	neg ***	neg ***		neg ***		neg ***			neg
Colony					neg ***			neg (nr)	neg ***	pos ***		neg
Landlocked									pos ***		pos ***	pos
Neighbour dummy (=1, if product exported to neighbouring country)					neg ***						pos (ns)	neg
Log total import value of country i				neg ***				neg (nr)				neg
log total export of country i				neg ***	neg ***							neg
Log total exports in industry by country j					neg ***							neg
Log total exports of the product to all other countries in first year					neg ***							neg
Log total imports of the product from all other countries in first year					neg ***							neg
Initial Export Value		neg **			neg ***	neg ***	neg ***		neg ***	neg ***	neg ***	neg
Initial Import Value			neg ***	neg ***				neg (nr)				neg
Log unit value of imports				neg ***							pos ***	neg
Log number export products				neg ***		neg ***		neg (nr)		neg ***		neg
Log number of export markets						neg ***		neg (nr)		neg ***		neg
Log number of exporters				neg ***								neg
Coefficient of variation of unit values for each HS product in country j in each year	neg ***									pos ***		pos
Differentiated Goods								neg (nr)	neg ***		neg ***	neg
Homogenous Goods	pos ***								pos ***			pos

continued

Table 4.3 continued

Study (No. as in Table 4.1 and Table 4.2)	2	3	4	5	6	7	8	9	10	12	13	Expected sign
Reference price products	pos ***											pos
Agricultural Goods	pos ***		neg ***									pos
Parts and Components		neg **	pos ***								neg ***	neg
Finished Products											neg (ns)	neg
Exporter LDC								neg (nr)				pos
Multiple spells	pos ***	pos **	pos ***		neg ***				pos ***		neg ***	pos/neg
Frequent Breaks Dummy		pos **										pos
Business (time)									neg ***			pos
Export costs(time)									neg ***			pos
Import Costs(time)									neg ***			pos
Average tariff in country j	neg ***											pos/neg
Log transport costs to move products from country i to j	pos ***		pos ***				pos ***					pos
Exchange Rate Misalignment					neg ***		neg ***					neg
Foreign Exchange Volatility	neg ***		neg ***	neg **	neg ***			pos (nr)	neg ***		neg ***	pos
PTA Dummy					pos ***		neg ***					neg
EU Member Dummy				pos (ns)				neg (nr)				neg
EMU Dummy				neg ***								neg
WTO Member Dummy											neg ***	neg
Country j is a NAFTA Member										neg ***		neg
NAFTA Dummy (=1 in NAFTA years)										pos ***		neg
Log elasticity of import demand in country j							pos ***					pos
Log Financial Development in country i							neg ***					neg
Rule of Law index in country i							neg ***					neg
Increasing Returns to Scale in Manufacturing										pos ***		neg
Increasing Returns to Scale in Natural Resources										neg ***		neg
Firm Employment						neg ***						neg
Firm Age						neg *						neg

Note: Levels of significance are indicated by *** p<0.01, ** p<0.05, * p<0.1. Also note that, nr indicates the level of significance is not reported, ns indicates the coefficient is not significant, neg indicates negative sign and pos indicate positive sign on the respective coefficient.

An examination of Table 4.3 indicates that most studies find results in keeping with expectations and theoretical priors. To illustrate, in terms of the gravity type covariates, most studies find the expected negative relationship between economic size variables (GDP and GDP per capita) and the hazard rate, suggesting that trade partnerships involving larger countries face lower hazards. The intuition for this is that larger countries have larger markets and the probability of finding and maintaining suitable export relationships is greater. With regard to distance, all studies find the expected positive result suggesting that greater distance between countries increases the hazard rate. The expectation is that the greater distance of trading partner, the greater the trade costs ant this increases the hazard of trade relationships. Also, in terms of common language and common border, studies generally find the expected negative result suggesting that hazard rate is lower for countries sharing common language and common border. The expectation is for the hazard rate to be lower with trading partners sharing common language and border because the transactions costs for trade with these types of partner countries are expected to be lower. The results with respect to colony seems to be mixed with most studies reporting the expected negative and relationships but in the case of study 12 the coefficient here is positive and highly significant. Also, the two studies including landlocked reported the expected positive relationship with the hazard rate. The results with respect to PTA membership have been mixed with one study reporting the expected negative relationship with the hazard rate and the other reporting a positive relationship. With regard to product characteristics variables, the three studies including differentiated goods in their specification recorded the expected negative relationship with the hazard rate. Also, the two studies including homogenous goods and sole study including reference price goods in their specifications recorded the expected positive relationship with the hazard rate. In terms of our trade cost variables, the sole study including business time, import cost and export cost reports the surprising result that higher business, import and export cost reduces the hazard rate. This result seems counterintuitive as we expect higher trade costs to increase rather than reduce the hazard rate as the chances of establishing profitable trade relationships are more difficult. With regard to average tariff, the sole study including this variable finds a negative and significant relationship with the hazard rate. As it pertains to variables capturing spell characteristics, initial import and export value is negative in all specifications where they are present suggesting that the hazard rate is lower with higher initial value of exports and imports, thereby confirming the key predictions of the Rauch and Watson (2003) model. Also, studies in general find that multiple spells increases the hazard rate.

4.2.3 Evaluation of Existing Literature

Notwithstanding the growing literature on trade duration, a key observation is that most empirical studies tend to focus on developed countries and the larger emerging economies. We therefore have a fairly good understanding of what factors affect export duration in the context of developed countries and the larger emerging economies. The question that remains unanswered in the empirical literature is whether the factors are the same for smaller developing countries? This issue is important for developing countries as export duration is inextricably linked to export growth and is also critical in the formulation and effectiveness of trade policy. Given that many developing countries have, and continue to pursue, a development strategy of export-led growth, understanding export duration and what drives it is critical. This work, therefore, seeks to fill a gap in the literature by looking at the issue of export duration and its determinants in the context of a small industrializing economy.

Further, many of the existing studies on export duration devote considerable effort looking at how product characteristics influence duration (see Besedeš and Prusa, 2006b, Besedeš, 2008; Corcoles et al., 2012; Shao et al., 2012). We therefore know that the export of both homogenous goods and reference price goods will increase the hazard rate, while the export of differentiated goods will reduce the hazard rate. However, not enough is known about the influence of trade policy and institutional factors on export duration. Thus, our work seeks to fill an important gap in the existing trade duration literature by looking at the impact of a wide range of trade policy variables and institutional factors on export duration. Examining export duration in the context of Trinidad and Tobago offers us a fundamental advantage, in that, the country has used a wide range of trade policy instruments to promote economic growth and development. Thus, by using Trinidad and Tobago, we are able to provide fresh evidence on the impact of trade policy, as well as institutional factors, on export duration. For example, one of the areas that have been unexplored in the trade duration literature is the effect of trade promotion on trade duration. Notably, export promotions in export destinations impacts trade duration mainly via a demonstration effect and a consumer effect. With regard to the former, export promotions help with the diffusion of information on the market as more and more prospective exporters find out about the export destinations. In terms of the latter, export promotions have a consumer effect as new consumers find out and are consequently persuaded about sources of imports thereby expanding the customer base of exporters. In addition, export promotions influences duration by reducing uncertainty in export relationships. We therefore seek to provide the first evidence on the effect of trade promotion though Embassies and Consulates on export duration. Thus, this study will complement ongoing work in the trade literature that looks at the impact of trade promotion institutions on exports as well as the intensive and extensive margins of exports (see Rose, 2007). In addition, only a few of the existing studies have looked at the impact of institutional quality and governance on trade duration. Thus, our work aims at yielding fresh evidence on the impact of institutions and governance on export duration. In this regard, our work will enrich a growing body of literature looking at the effect of institutions and governance on trade. In addition, we are able to provide new evidence on the impact of WTO membership of a country's trading partners on the duration of its export. This study will therefore complement existing work in the literature that looks at the effect of WTO membership on trade (see Rose, 2004). Also, we are able to provide new evidence on the impact of regional trading agreements of trading partners on export duration by examining the effect of CARICOM membership of Trinidad and Tobago's trading partners on export duration. Relatedly, we seek to provide fresh evidence on the impact of trade partner's tariffs on export duration.

4.3 The Measurement of Export Duration

In this section, we look at the measurement of export duration in empirical studies. This section consist two subsections. First, using a hypothetical example, we look the approach to measuring export duration. Along the way, we explain some of the key concepts in measuring duration. In the second section, we examine the data requirements for, and data issues that arise in, the measurement of export duration.

4.3.1 The Approach to Measuring Export Duration

To illustrate, we assume the dataset consist HS 6-digit export data for Trinidad and Tobago for the period 1996-2009. The key first step in measuring duration is to create a panel of export destinations where each product is exported to. The next critical step involves converting the annual raw data into spells of service for each export relationship. In export duration analysis, a trade relationship is defined as a certain product being exported to a specific export destination. And, a trade spell is defined as a period of continuous (uninterrupted) export of a given product to this export destination. These spells constitute the core unit of analysis and spell duration is simply calculated as the number of consecutive years with non-zero exports of a certain product to a specific export destination. The number of spells differs from the number of trade relationships (i.e importer-product combinations), since any of the trading parties may choose to terminate the trade relationship and revive it at a later point in time. Importantly, if the same product is exported to the same country in two (or more) distinct non-overlapping spells of service; they are treated as two independent spells and such reoccurring trade relationships are referred to as multiple spells of service (see Besedeš and Prusa, 2006a and 2006b; Hess and Persson, 2012). In the Table 4.4 below, we use an illustrative table to explain some of the critical concepts in the measurement of export duration.

Table 4.4: Illustrative Example of Data: Exports by Trinidad and Tobago of Steel (HS 722490) to Selected Countries, 1996-2009.

Country	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	No. of Years	Spells
USA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	14	1
CANADA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	14	1
BRAZIL											X	X	X	X	4	1
ARGENTINA			X												1	1
CHINA			X	X	X	X	X	X	X	X	X	X	X		11	1
JAPAN	X	X	X	X		X	X	X	X	X	X	X	X	X	13	2
VENEZUELA				X	X			X	X	X	X	X	X	X	9	2
COLUMBIA		X	X			X	X	X	X	X	X	X	X	X	11	2
INDIA							X	X	X	X	X			X	6	2
GERMANY	X	X				X	X	X	X	X	X				8	2
JAMAICA			X	X				X	X	X	X	X	X	X	9	2
BARBADOS				X	X		X	X	X	X	X	X	X	X	10	2
ITALY				X				X				X			3	3
FRANCE		X				X								X	3	3
NETHERLANDS	X		X	X			X	X	X	X	X	X	X	X	11	3
MEXICO					X			X			X			X	4	4
GHANA				X		X			X			X		X	5	5
PERU			X	X		X	X		X		X	X		X	8	5
SOUTH AFRICA		X		X		X		X		X		X			6	6
HONDURAS		X		X		X		X		X		X		X	7	7

Table 4.4 represents an illustrative table for a representative product, Steel (HS 722490). The X's in the table indicate years in which Trinidad and Tobago exported the product to different export destinations in the period 1996-2009. It is evident that Trinidad and Tobago has not exported the product to all the countries in all years. Periods of Trinidad and Tobago continuously servicing a market are referred to as a spells or episodes. An event when Trinidad and Tobago stops exporting to a specific market is called a failure.

Given our sample period, the maximum length of a spell is 14 years. At the extreme, if Trinidad and Tobago exported a product to a market in every other year, the maximum number of spells and failure in the sample is 7.

Notably, there are countries to which Trinidad and Tobago exported steel every year, such as USA and Canada. Exporting a product in every observed year creates a 14-year-long spell. There are three other export destinations namely Brazil, Argentina and China where exporting results in a single spell. In the case of Brazil, Trinidad started exporting to this market in 2006 and this continued to the end of the period. In the case of Argentina, there was a single spell export of just one year in 1998. And, in the case of China, exporting started in 1998 and ended in 2008. Beside the single spells, there are numerous instances in which Trinidad and Tobago services an export market with multiple spells (more than one spell). To illustrate, there are a number of export destinations such as Japan, Venezuela, Columbia, Germany, Jamaica and Barbados where export occurred in two spells. For example, Trinidad and Tobago exported steel to Japan in every year except 2000. In the case of Venezuela, Trinidad and Tobago service the market in 1999 and 2000 (first spell, length 2) and then serviced the market for a second time from 2003 for the remainder of the observed period. Trinidad and Tobago serviced the remaining export markets with 3 or more spells.

Calculating duration (or spell length) then appears to be quite straightforward: it is simply the time (measured in years) that a trade relationship has been in existence (without interruption). For every export destination and product (trade relationship), we calculate the duration of trade as the number of consecutive years with non-zero exports. With export duration analysis, the primary focus is to study the length of time until the exporting country (Trinidad and Tobago) ceases to export a certain product to a particular market an event we refer to as a "failure". Calendar time is not as important as analysis time which measures the length of time Trinidad and Tobago exports a product to a specific market. If Trinidad and Tobago exported product i to market c from 1996 to 2000, the ci^{th} trade relationship has a spell of length of five. In total, in our illustrative example, there are 19 trade relationships but 56 trade spells. Notably, the number of spells is greater than the number of trade relationships because some relationships reoccur.

Alternatively, applying statistical techniques from survival analysis, duration can be modelled as a sequence of conditional probabilities that a trade relationship continues after t periods given that it has already survived for t periods. To illustrate, we focus on the case with only two states: a product is either being exported or not; in other words, a trading relationship either exists or not. All products start in the initial state with positive exports, and each product either ceases to be exported and exits the initial state or is censored before exiting. In survival analysis, this transition from the initial stage to the next is referred to as "failure" or "exit". In our example, the end of a trade relationship or the fact that a product ceases to be exported is used interchangeably to mean failure or exit.

Let T denote time to a failure event (spell length). Since time in the analysis is discrete, we assume T is a discrete random variable taking on values t_i, i=1,2,….n, with a probability density function $p(t_i) = \Pr(T = t_i)$, i=1,2,….n, where $t_1 < t_2 < ....t_n$. The survival function for a random variable T is given by:

$$S(t) = \Pr(T > t) = \sum_{t_i > t} p(t_i) \qquad \textbf{4.1}$$

In a similar fashion, the hazard function is the probability that the trade relationship dies after t periods given that it has survived up to that point. The hazard function is:

$$h(t_i) = \Pr(T = t_i \mid T \geq t_i) = \frac{p(t_i)}{S(t_{i-1})}, i = 1,2,....n \qquad \textbf{4.2}$$

Where $S(t_0) = 1$. The survival function and the hazard functions are related through the following expression:

$$S(t) = \prod_{t_i < t} [1 - h(t_i)] \qquad \textbf{4.3}$$

To estimate the survival and hazard functions, we assume there are n independent observations denoted $(t_i, c_i), i = 1,2,...., n,$ where t_i is the survival time and c_i is the censoring indicator variable C of observation i. If failure occurred, c_i takes on a value of 1, and 0 otherwise. Assuming there are $m \leq n$ recorded times of failure, we can denote the rank-ordered survival times as $t_{(1)} < t_{(2)} < ...... < t_{(m)}$. Let n_i denote the number of subjects at risk of failing at $t_{(i)}$, and let d_i denote the number of observed failures. The Kaplan-Meier product limit estimator of the survival function is then:

$$\hat{S}(t) = \prod_{t_{(i)} \leq t} \frac{n_i - d_i}{n_i} \qquad \textbf{4.4}$$

With the convention that Ŝ=1 if $t < t_{(1)}$. The Kaplan-Meier estimator is robust to censoring and uses information from both censored and non-censored observations (see Kaplan and Meier, 1958).

The hazard function is estimated by taking the ratio of subjects who fail to the number of subjects at risk in a given period *i*,

$$\hat{h}(t) = \frac{d_i}{n_i} \qquad \textbf{4.5}$$

Notably, to facilitate Kaplan-Meier estimation and the estimation of hazard functions (duration analysis), the data has to be organized in spells where each spell is accorded a row of data. In this format, for each spell there is information on the product code, the export destination, the start and ending dates of the spell, the length of the spell in years and information on whether failure or censoring occurred at the end of the period. Moreover, after Kaplan-Meier estimation, it is sometimes necessary to test the equality of two or more estimated survival functions. To do this, the Log-Rank test is most commonly used. The null hypothesis is that survival functions of the groups under consideration are equal and the alternative hypothesis is that they are not equal.

4.3.2 Data Requirements and Issues in Measuring Export Duration

The choice of data aggregation is particularly important for any analysis of duration of trade. In general, periods of continued trade tend to become longer, the more aggregated the data. This occurs because the wider the range of products that are covered by a particular classification, the higher is the probability that at least one product is traded in that category for a given year (see Besedeš and Prusa 2006b; Besedeš and Blyde 2010; Shao et al., 2012). In empirical work on trade duration, it is generally more desirable to use highly disaggregated data because this allows the researcher to more effectively capture competitive dynamics at the product level (Besedeš and Prusa, 2006a). However, there are limitations with using data that are too highly disaggregated. For example, according to Besedes and Blyde (2010) and Shao et al. (2012), modifications of product codes may affect the results more strongly when using highly disaggregated data.

Another fundamental issue to take into consideration when measuring duration is the issue of censoring. As Besedeš and Prusa (2006a) indicated, censoring can come in two flavours. A first type of censoring occurs when there are observations for which there is uncertainty regarding either the beginning or the ending date (or both) for some trade relationships. With regard to this type of censoring, observations can be either left or right censored (or both). In the case of left censoring, it means that a relationship is observed in the first year of the sample yet with no indication of its actual beginning time. From our illustrative example in Table 4.4, there are positive exports in 1996 to USA, Canada, Japan, Germany and the Netherlands. Exports to these markets are considered to be left censored. Reasoning analogously, right censoring implies that a relationship is observed in the final year of sample period, but we don't know whether it actually ends or not. Relationships observed in 2009 are right-censored as they may have truly ended in that year or at a later unobserved time. From our illustrative example in Table 4.4, these include exports to some 15 countries such as USA, Canada, Brazil, Netherlands and Barbados. Right censoring is a less serious problem since this can be more adequately treated by the techniques used to estimate duration. Notably, the estimation techniques use the information on the time of survival up to the censoring point but do not make any inference upon what happen to the spell subsequently. But for left censoring, there are not any efficient techniques to deal with it. Econometric techniques that deal with left-censored spells efficiently typically have to rely on strong assumptions or supplementary data (which is not available in our case). In this regard, the practice in empirical work is for researchers to exclude the left-censored observations from the sample in performing duration analysis (see Besedeš and Prusa, 2006a; Nitsch, 2009; Brenton et al., 2009). A second type of censoring is unique to product level data. This occurs due to the reclassification of products. Product codes are often revised, resulting in the deletion of some codes and the introduction of new ones. These reclassifications entail not only splitting a single code into multiple codes, but also, combining multiple codes into a fewer number of new codes (see Pierce and

Schott, 2012). If the reclassification of products is not considered, the accuracy of duration analysis can be compromised as the observed duration of trade relationship is shorter than the true length of the partnership.

Another critical issue to be dealt with pertains to the fact that some trade relationships have multiple spells. There may be cases in which a product *x* is initially exported to a country *c*, ceases to be exported to this country, and then after a period it is exported again. There is a possibility that some of the reported multiple spells are not different episodes but the result of measurement error. For example, looking at Table 4.4 in the case of Barbados, we observe a relationship in 1999 and 2000 and then again between 2002 and 2009. These can be treated as two different spells of service. However, it may be that the relationship in 2001 is not observed because there was a measurement error. Therefore, interpreting the initial spell as 'ending' in 2000 is inappropriate. It may be more adequate to interpret the two spells as one longer spell lasting from 1999 to 2009. To allow for such misreporting, as part of their robustness checks, many studies follow Besedeš and Prusa (2006b) and Besedeš and Blyde (2010) and assume that a one year gap between spells is an error, and merge the individual spells and adjust the spell lengths accordingly. Gaps of two or more years are assumed to be accurate and result in no adjustment. In some of the estimation work, as part of our robustness checks, we follow the convention in the literature and adjust spells with one year gaps between them to form longer spells. Another issue with multiple spells pertain to the assumption that they are independent. To check the robustness of this assumption, the standard practice in the trade duration literature is to estimate using samples with single spells only and first spells only. We follow this convention later in our estimation work as part of the robustness checks.

Another important issue to be considered in duration analysis is whether results are biased by the prevalence of small value trade transactions. Studies generally allow for this by applying minimum threshold requirements. This not only eliminates minor errors in the data, it gets rid of values that might not be meaningful enough to be counted as a trade flow (Besedeš and Prusa, 2006a; Nitsch, 2009). In some of the estimation work, as part of our robustness checks, we exclude spells under a certain minimum threshold.

4.4 Descriptive Statistics on Trinidad and Tobago's Export Duration

4.4.1 Introduction

In this section, we present some stylized facts on the measurement of Trinidad and Tobago's export duration. We do this by looking at some summary statistics and Kaplan-Meir survival functions for our benchmark (whole sample) dataset as well as various subsamples and scenarios. Our benchmark dataset is constructed using HS 6-digit manufacturing export data for Trinidad and Tobago's for the period 1996-2009. We had the option of using data at a more disaggegated level like HS 8-digit but we did not because problems of changes in product classification are increased the more disaggregated the data. We also had the option of using data at a more aggregated level such as HS 4-digit but we did not because trade duration is generally longer the more aggregated the data (Besedeš and Prusa, 2006a; Shao et al., 2012). We use manufacturing exports because export promotion policies typically focus on manufactured goods. Our definitions of a trade relationship and a trade spell follow the tradition in the literature. Also, in line with the literature, we treat reoccurring trade relationships (multiple spells) as independent spells. In addition, to avoid our results being compromised by changes in the classification of products during our sample period, our dataset was adjusted using correlation tables available at the World Customs

Organization (WCO) website. The issue of concordance is more fully explained later in our data section.

4.4.2 Summary Statistics of Trinidad and Tobago's Export Duration for Various Samples

The table below provides summary statistics on export duration for both our benchmark case (whole sample) and for alternative treatments of the data.

Table 4.5: Summary Statistics of Trinidad and Tobago's Export Duration (various samples).

Sample	No. of product codes	No. of spells	Mean duration (years)	Median duration (years)	Survival estimates 1 year	Survival estimates 5 years	Survival estimates 10 years	Survival estimates 14 years
Benchmark	1842	37,515	2.34	1	.42	.14	.09	.07
Left Censoring	1834	32,790	1.88	1	.39	.11	.06	-
First Spell	1842	22,325	2.62	1	.39	.15	.10	.08
Single Spell	1822	12,918	2.99	1	.37	.22	.18	.16
Gap Adjusted Spells	1842	30,292	3.13	1	.49	.23	.14	.12
Initial value≥$10,000 TT	1395	11,119	3.32	1	.54	.25	.18	.15
HS 4-digit	516	18,447	2.75	1	.47	.19	.14	.12
HS 2-digit	61	4,757	3.37	1	.51	.24	.20	.19

Notes: The benchmark case consists of the entire sample and uses HS 6-digit data. Left censoring excludes spells with start date 1996 (left-truncated spells) from the benchmark dataset. First spell consists only the first reported spell for each country-product pair from our benchmark dataset. Single spell considers only country product pairs without multiple spells from our benchmark dataset. Gap adjusted spells combine spells from our benchmark data set with one year gaps between them to form longer spells. Initial value ≥$10,000TT excludes spells from the benchmark dataset with initial export value under $10,000TT. HS 4-digit and HS 2-digit consider data at higher levels of aggregation.

In the Table 4.5 above, the survival estimate gives the proportion of the trade relationships that remain in existence at specific periods of time. The first row of the table reports information on our benchmark (whole sample) using the HS 6-digit data.

The benchmark dataset consist of 37,515 spells with an average spell length of 2.34 years and a median spell length of 1 year. Further, we see that only 42% of the relationships survive longer than 1 year, 14% survive more than 5 years and 7% remain in existence for the entire sample period. The frequency of the various spell lengths can be found in Table A4-3 in the appendix. It is evident from this table that more than 75% of the spells have duration of 1 or 2 years. What is quite evident from the forgoing analysis is that Trinidad and Tobago's manufacturing export duration is relatively short. In this context, our results are in line with the findings of several earlier studies done primarily for developed countries and larger emerging economies which suggest trade relationships are extremely short (for example Besedeš and Prusa, 2006a; Besedeš and Prusa, 2006b; Fonseca, 2008; Brenton et al., 2009; Nitsch, 2009; Hess and Persson, 2011; Nicita et al., 2011; Fugazza and Molina, 2011; Chen, 2011; Shao et al., 2012; Esteve-Perez et al., 2013). Given that Trinidad and Tobago is a small developing country, with a relatively undeveloped manufacturing sector, our results is not surprising.

We considered excluding left censored observations, that is, spells for which the effective start date is unknown. Thus, we drop all spells with start date of 1996 and we observe the mean duration is even shorter 1.88 years, while the median remains unchanged. Also, the survival rates across the various time periods are only slightly lower than in our benchmark case.

In the analysis of our benchmark dataset, we use all spells per country-product pair and we assume they are independently distributed. That is, if after being dissolved a trade relationship is formed again, we assume this is completely independent of previous ones. By doing this, we implicitly assign greater weights to country-product pairs which have multiple spells. Consistent with the approach taken by several studies in the literature (for example Besedeš and Prusa, 2006a; Fonseca, 2008; Nitsch, 2009; Chen, 2011), to check the robustness of our results under the assumption of independence among spells, we considered three alternative samples: (i) consisting of the first spell of each trading relationship (which includes relationships with just a single spell and the first spell of multi-spell relationships; (ii) consisting of relationships which have only a single spell; and (iii) combining one-year gaps between spells to form longer spells under the assumption that small gaps have been misreported (longer gaps assumed to be correct and are not adjusted for). It is evident from Table 4.5 above, when we limit our sample to include only first spell of relationships, we are left with 22,325 spells whose mean and median lengths are 2.62 years and 1 year, respectively. When compared to the mean and median length obtained in the benchmark data, while the mean spell length is higher for first spells, the median is unchanged and our central result of short export duration is unaffected. Moreover, the survival estimates over the various time periods seem to be quite similar. Further, limiting ourselves to the study of single spells reduces the benchmark sample even more and we are left with 12,918 spells. Even though the median spell length is still the same as in the benchmark case, the mean is now higher 2.99. Notwithstanding the increase in the mean duration, our central finding of short export duration is unaltered. Further, when we apply the one-year gap adjustments to our benchmark dataset, we are left with 30,292 spells which last on average 3.13 years with median duration remaining unchanged at 1. Despite slight changes in average duration resulting from alternative treatment of the data, the central message is that Trinidad and Tobago's manufacturing export duration is extremely short. Again our findings here are consistent with those of several empirical studies (Besedeš and Prusa, 2006a; Besedeš and Prusa, 2006b; Brenton et al., 2009; Nitsch, 2009; Hess and Persson, 2011; Nicita et al., 2011; Chen, 2011; Esteve-Perez et al., 2013; Shao et al., 2012).

Further, we examined whether part of the explanation for the short duration of trade is the prevalence of small value trade transactions. Therefore, we dropped spells with initial trade value under $10,000TT. We are left with 11,119 spells, although the median length spell length remains at 1, the average spell length is now approximately 1 year higher than what obtained in the benchmark case (it is now 3.32) years. This suggests that our results may to some extent be influenced by the initial transaction size. Our results in this regard are consistent with several previous studies (Besedeš and Prusa, 2006b; Ferto and Soos, 2008; Nitsch, 2009; Hess and Persson, 2011).

We also considered more aggregated data by looking at the survival pattern with respect to HS 4-digit and 2-digit classification. Our results suggest that while the median survival rate is not very sensitive to the level of aggregation of the data, the mean survival rate increases the more aggregated the data. Our findings here are not surprising as we expect the more aggregated the data, the longer will be the trade duration. The rationale for this is that in any given year, the wider the range of products covered by an industry classification, the higher the probability that at least one product can be traded in that category. To illustrate, using HS 4-digit data, we are left with 18,447 spells and the mean survival rate increases to 2.75 years from the benchmark average of 2.34 years. Further, we find that only about 47% of the trade relationships survive after 1 year, while only 19% survive after 5 years and 12% remain in existence for the duration of the sample. Focusing our attention to HS 2-digit level, we are left with only 4,757 spells. The mean duration is now even higher than it was when we use HS 4-digit data. The mean duration is now 3.37, while the median spell length is unaffected. Also, we observe that about 51% of the trade relationships survive after 1 year, while 24% survive after 5 years and 19% remain in existence for the period of the sample. What seems quite evident is that regardless of how aggregated the data are, our previous finding of relatively short lived relationship remains unaltered. Our results here are in line with several previous studies (for example Besedeš and Prusa, 2006a; Fonseca, 2008; Nitsch, 2009; Hess and Persson, 2011; Shao et al., 2012).

4.4.3 Summary Statistics of Trinidad and Tobago's Export Duration by Country Groups

We then focus our attention to looking at Trinidad and Tobago's export duration pattern with respect to some different categories of export destinations. The summary statistics are presented in Table 4.6 below.

Table 4.6: Summary Statistics of Trinidad and Tobago's Export Duration, by Country Groups.

	No. of product codes	No. of spells	Mean duration (years)	Median duration (years)	Survival estimates 1 year	Survival estimates 5 years	Survival estimates 10 years	Survival estimates 14 years
Panel A: CARICOM versus non-CARICOM								
CARICOM	1751	21,751	2.73	1	.49	.18	.12	.10
Non-CARICOM	1514	15,764	1.79	1	.34	.08	.05	.04
Panel B: Income Groups								
Low Income	211	332	1.50	1	.28	.04	.02	.02
Middle Income	1728	20,722	2.60	1	.46	.17	.11	.10
High Income	1503	10,592	2.03	1	.37	.11	.07	.05
Panel C: Five Major Export Markets								
USA	1,008	1,990	2.26	1	.43	.14	.09	.06
Mexico	101	136	1.32	1	.43	.13	.06	.00
Canada	450	747	1.74	1	.32	.07	.04	.01
Jamaica	800	1,379	2.45	1	.44	.15	.09	.08
Barbados	1,239	2,360	3.02	1	.53	.22	.15	.12

Notes: Estimates in this table are generated based on the benchmark dataset in Table 4.5 (HS 6-digit data). Also, the countries listed in panel C represents Trinidad and Tobago's five (5) most important export markets (based on value of exports).

It is immediately evident from Table 4.6 that while, the median duration with respect to CARICOM and non-CARICOM countries are the same, the average duration for exports to CARICOM countries are higher than those with respect to exports to non-CARICOM countries. Indeed, the mean duration for exports to CARICOM countries is 2.73 years, while that for non-CARICOM countries is only 1.79 years. Our results also indicate that after 1 year, while 49% of the export relationships with CARICOM countries survive, the corresponding figure for non-CARICOM countries is 34%. Likewise, after 5 years, while 18% of the export relationships with CARICOM countries survive, the corresponding figure for non-CARICOM countries is 8%. Moreover, 10% of the relationships with CARICOM countries remain in existence for the entire time period, while the corresponding figure for non-CARICOM countries is only 4%. The relatively higher survival rate with respect to trade with CARICOM countries does not come as a surprise, and can be attributed to the trade creating effect of CARICOM preferences as well as the fact that CARICOM countries are geographically close to Trinidad and Tobago (lower trade costs). Our results here are consistent with several other studies that report a positive relationship between trade preferences and export survival rates (for example Obashi, 2008; Besedeš, 2012).

Focusing our attention to the survival rate among different groups of countries classified on the basis on the World Bank income definition, we observe some interesting results.[4] It is immediately evident that the mean duration of exports to low income countries is the lowest (1.5 years), while that for middle income countries is the highest (2.60 years). The average duration for high income countries is only 2.03 years. Moreover, after 1 year, only 28% of the exports to low income countries survive, while the corresponding figures for high income and middle income countries are 37% and 46%, respectively. Also, after 5 years only 4% of the exports to low income countries survive, while the corresponding figures for high income and middle income countries are 11% and 17%, respectively. Further, only 2% of the exports to low income countries survive for the entire sample period, while the corresponding figures for high income and middle income countries are 5% and 10%, respectively. Our results for export to low income

[4] Note that countries are classified as high income, middle income and low income on the basis of the World Bank Income classification. World Bank classifies economies according to 2010 GNI per capita, using the Atlas method. With this method, low income countries are those with GNI per capita $1,005 or less; middle income are those in income range $1,006 -$12,275; and high income are those with income $12,276 or more.

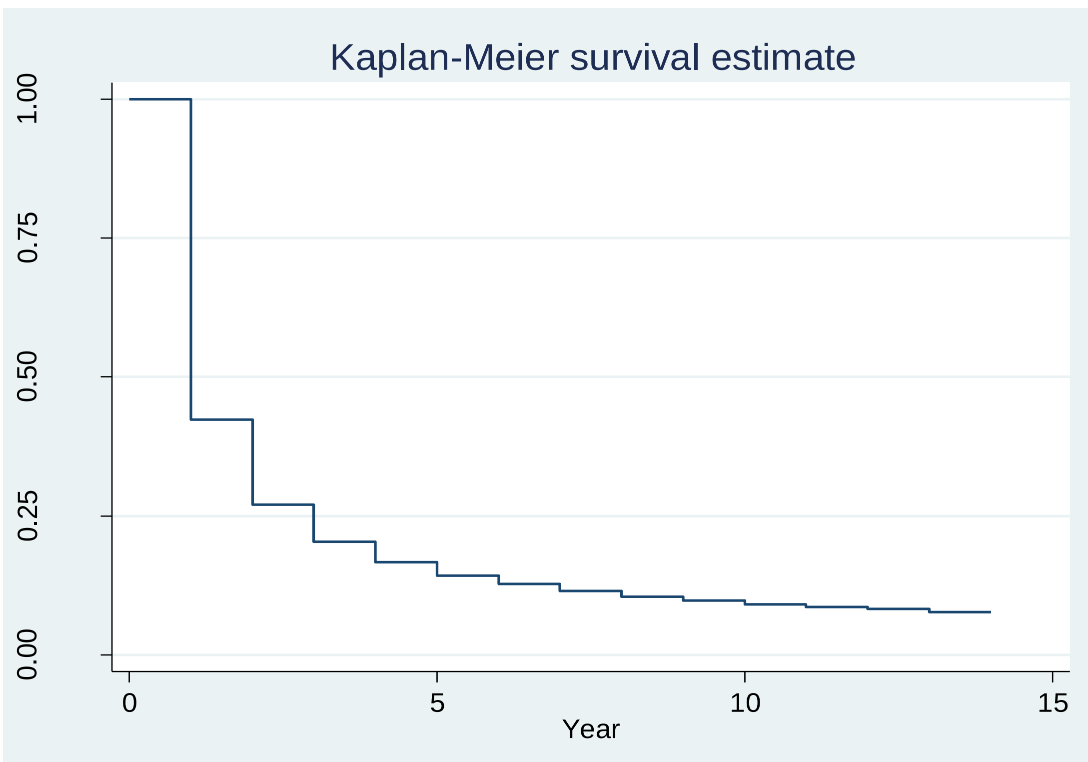
countries is quite expected given that purchasing power in low income countries is relatively smaller than that for the other categories of countries. In addition, import demand in low income countries is less stable than it is in the case with the other groups of countries. However, our result with respect to high and middle income countries is somewhat surprising, in that, we expected exports to high income countries to face higher probability of survival than exports to middle income countries. However, an examination of the composition of the various groups of countries indicates that many of the high income countries are more distant European countries. Thus, given that more distant trading partners are likely to face higher trade costs and lower survival rates, it could be that distance is having a dampening effect on survival, accounting for our somewhat surprising results. Also, many of the CARICOM countries are also middle income countries, so it is possible that we are also picking up a CARICOM effect (the effect of preferences).

We also considered the export duration with respect to Trinidad and Tobago's five (5) most important export markets. It is immediately evident that exports to its neighbouring Caribbean markets experience the best survival rates. The average survival rate for trade with Barbados and Jamaica is 3.02 and 2.45 years, respectively. The third highest survival rate is experienced for exports to the United States. Indeed, the mean duration for the United States is 2.26, almost the same as the average for the benchmark case. Of the major trading partners, the lowest export survival rate is experienced for exports to Mexico and Canada, with average survival rates of 1.32 and 1.74 years, respectively. Thus, what is evident is that even with respect to exports to Trinidad and Tobago's major export market, the duration of export is quite short.

4.4.4 Kaplan-Meier Survival Estimates (Benchmark Case)

We seek to analyse in more detail export duration by investigating nonparametric estimates of survival with the Kaplan-Meier estimator (Kaplan and Meier, 1958). The survival function gives the proportion of trade relationships surviving over the period of the sample. If the survival function plunges sharply from one year to the next, it indicates that a large proportion of the products that were being exported in that year, ceased to be exported in the following year. The Kaplan-Meier survival function estimation results are presented in the figures which follow. The figure below shows the survival function for the benchmark case (whole sample).

Figure 4.1: Kaplan-Meier Survival Estimates, Benchmark case

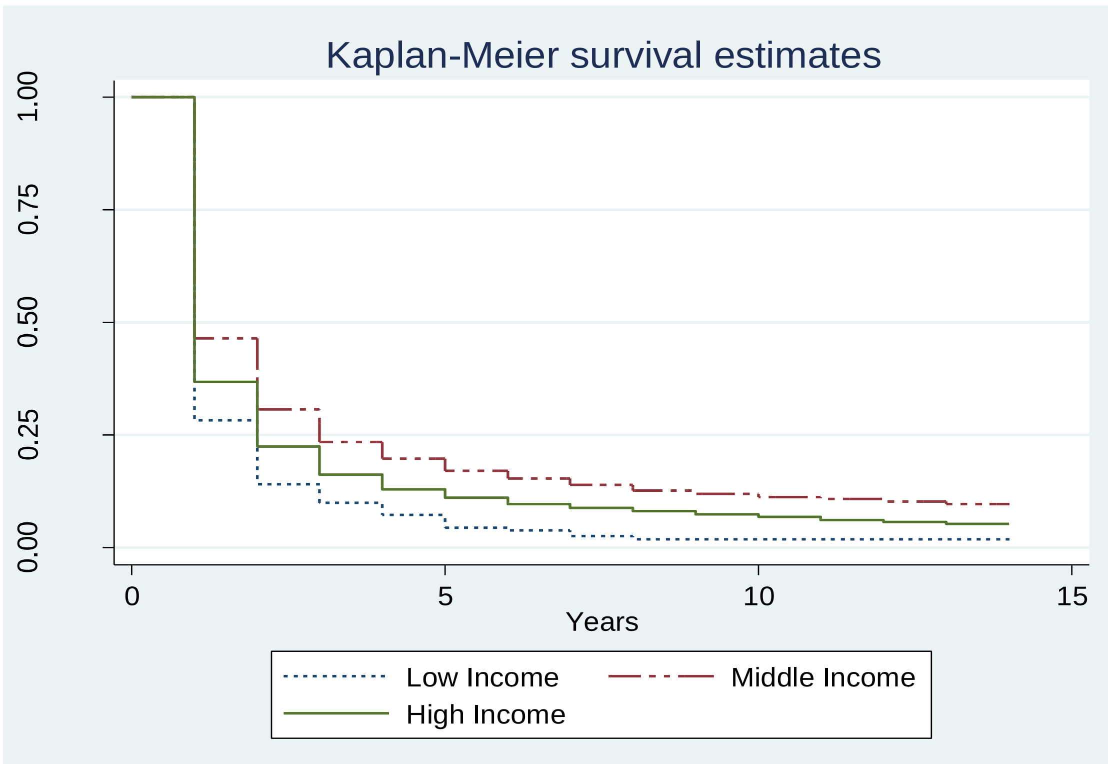


The sharp dip in our estimated survival function in Figure 4.1 confirms our general finding that Trinidad and Tobago export duration is short. More than 80% of the trade relationships die within the first five years of existence, and less than 10% remain in existence for the entire sample period. The estimated survivor function also gives us an idea of when trade relationships are more likely to end. We can also infer from the decreasing slope of the survival function, the risk of a trading relationship failing decreases with time. Thus, our survival function exhibits negative duration dependence. Our findings thus suggest that trade relationships are more likely to end in the early years of their existence. We investigated excluding left censored observations, and as our findings in Figure A4-1 in the appendix suggest, our main result of short export duration remain unaffected. This is expected, given that the Kaplan-Meier estimator is robust to censoring and uses information on both censored and non-censored observations. Our survival functions for both the benchmark case and when we considered censored observations are quite similar in appearance to those found in several previous studies (Besedeš and Prusa, 2006a; Besedeš and Prusa, 2006b; Besedeš, 2008; Nitsch, 2009; Brenton et al., 2009; Hess and Persson, 2011; Shao et al., 2012; Esteve-Perez et al., 2013).

4.4.5 Kaplan-Meier Survival Estimates (by Country Income Group)

We also constructed survival functions for different types of export destinations classified according to the World Bank income definition. Our results are presented Figure 4.2 below.

Figure 4.2: Kaplan-Meier Survival Estimates, by Income Groups of Export Destinations.

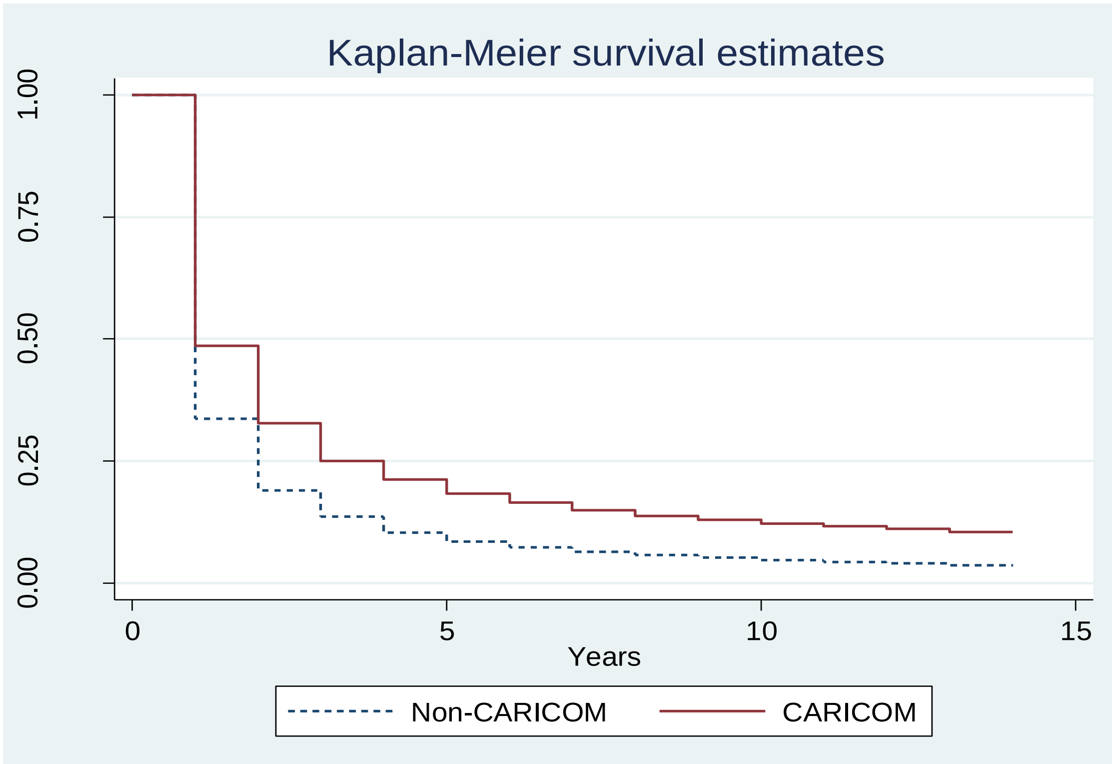


Consistent with our previous findings, our results in Figure 4.2 suggest that at every time period, exports to low income countries face the lowest survival rates while exports to middle income countries face the highest survival rates. We performed the Log-Rank test for the equality of the survival functions and the null hypothesis that survival functions are identical is strongly rejected with a p-value of 0.00. Our results differ slightly from Nicita et al. (2011), in that, while like us they find exports to low income countries face the lowest rate of survival, unlike our findings, they find exports to high income countries face the highest survival rates. The differences in our results maybe due to the dampening effect of distance given that many of Trinidad and Tobago' high income export markets are located further way.

4.4.6 Kaplan-Meier Survival Estimates (CARICOM and non-CARICOM countries)

We then examined the impact of trade preferences by looking at survival estimates for CARICOM and non-CARICOM countries. Our results are presented in Figure 4.3 which follows.

Figure 4.3: Kaplan-Meier Survival Estimates for CARICOM and non-CARICOM countries.

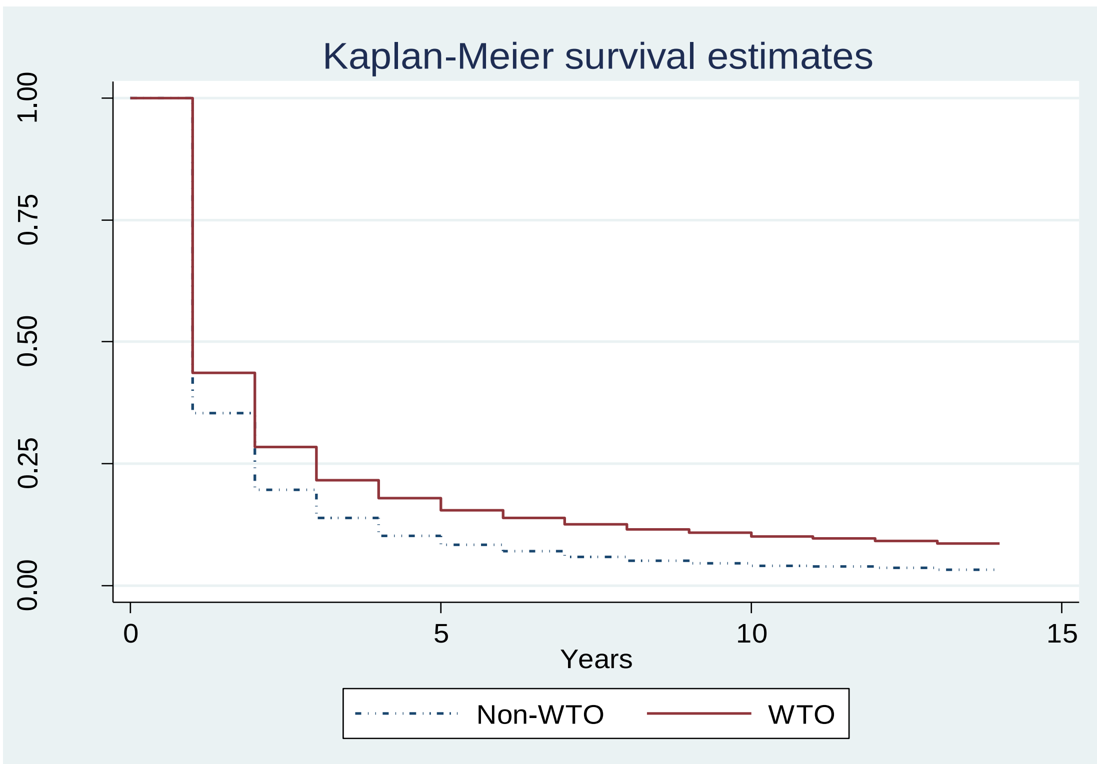


Consistent with our previous findings, it is evident from Figure 4.3 that exports to CARICOM countries tend to experience higher survival rates than exports to non-CARICOM countries over all time periods. We performed the Log-Rank test for equality of survival functions and strongly reject the null hypothesis of equality of the survival functions (p-values 0.00). Our findings suggest that CARICOM preferences positively affect Trinidad and Tobago's export survival. This result is not surprising and is in line with a fairly recent study by Besedeš (2012) looking at Mexico, Canada and the United States over the period 1990-2007, who finds that intra NAFTA exports enjoys a higher survival rate relative to exports to non-members. Also, Obashi (2008) finds that membership in ASEAN Free Trade Area (AFTA) increases export survival rate in participating countries over the period 1993-2006.[5]

4.4.7 Kaplan-Meier Survival Estimates (WTO and non-WTO countries)

We also considered the effect of WTO membership by looking survival functions for both WTO and non-WTO members. Our results are presented in Figure 4.4 which follows.

Figure 4.4: Kaplan Meier Survival Estimates for WTO and non-WTO member Countries.



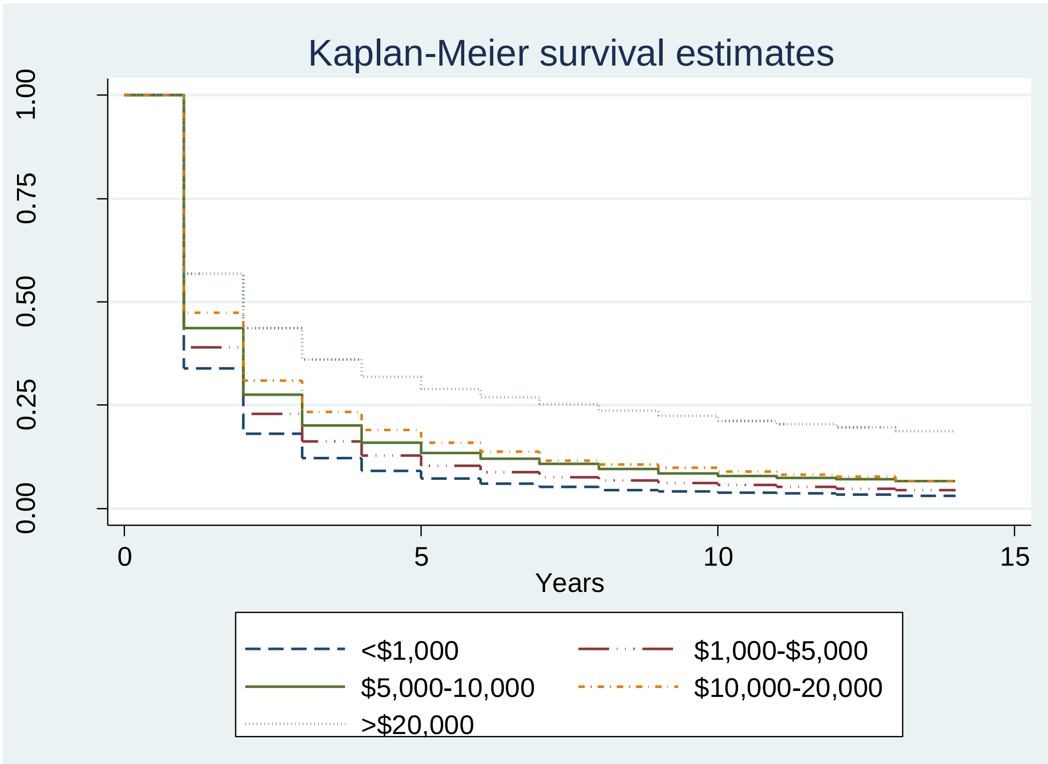
[5] Consistent results were also reported by Carrere and Strauss-Kahn (2012) who find that preferential trade agreements (PTAs) between 133 developing countries and OECD countries positively affects export survival over the period 1962-2009.

Our results in Figure 4.4 above suggest that Trinidad and Tobago exports experience higher survival rates for trade with WTO member countries than for trade with non-WTO countries. Our Log-Rank test confirms significant differences in the survival functions of the two groups. This result is not surprising, as we expect trade with WTO members to take place in an environment where there are common trade rules and generally better contract enforcement. Thus, we expect WTO membership of trading partners will have a positive effect on Trinidad and Tobago's export duration through reducing uncertainty. Our results are in line with work by Shao et al. (2012) who find that WTO membership positively affects export survival.

4.4.8 Kaplan-Meier Survival Estimates (by Initial Export Value)

We then look at whether the size of trade relationship in the first year of the spell affects duration. We estimate survival functions for relationships divided into five groups according to their starting size (i.e. the initial export value at the start of the spell): (i) ≤ \$1,000 TT (32% of relationships), (ii) >\$1,000 and ≤ \$5,000TT (27%), (iii) >\$5,000 and ≤ \$10,000TT (11%), (iv) >\$10,000 and ≤ \$20,000TT (9%), and (v) ≥\$20,000 (21%). The estimated survival functions are presented in Figure 4.5 below.

Figure 4.5: Kaplan-Meier Survival Estimates for Different Starting Value of Exports (in TT$).

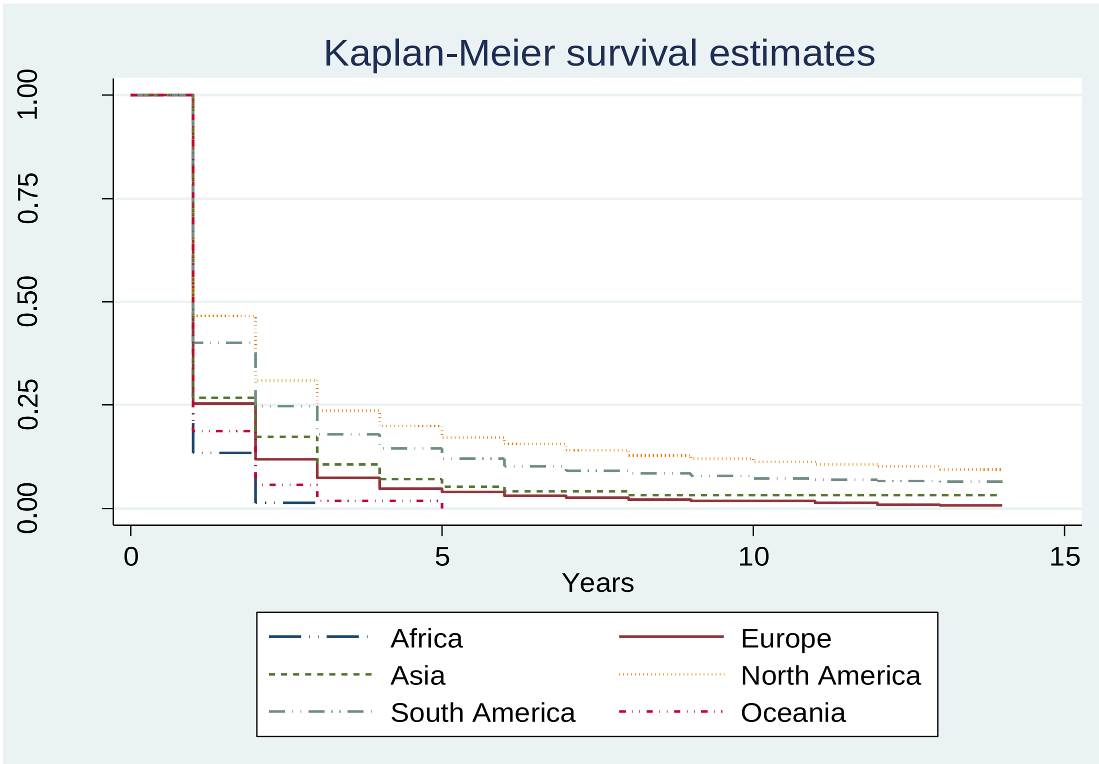


Our results in Figure 4.5 above suggest that the smaller the initial purchase, the lower the probability of survival, thus the shorter the duration of export. It is quite evident that relationships with initial value greater than $20,000 TT experience the highest survival rates, while relationships with initial value less than or equal to $1,000 TT experience the lowest survival rates. We performed the Log-Rank test for equality of the survival functions and the null hypothesis of equality of the survival functions is strongly rejected with p-value (0.00). Our results are largely in line with our theoretical priors and with empirical studies. For example, in the theoretical contribution by Rauch and Watson (2003), they argue that instead of starting a big order in the beginning, the importer tends to place small ones so as to find out supplier's capability. Therefore, initial value can indeed be regarded as a signal, with bigger value indicating more confidence in supplier's capacity to supply and meet quality requirements and increasing the likelihood of longer duration. Our general findings are consistent with several previous empirical studies (see Besedeš and Prusa, 2006b; Besedeš 2008; Fonseca, 2008).

4.4.9 Kaplan-Meier Survival Estimates (by Geographic Regions)

We then focus our attention on survival estimates across different geographic regions. Our objective here is to investigate the extent to which export survival rates differ across different types of destination markets. We anticipate, that trade costs and other transactions costs will vary across export destinations and affect the survival rate of export relationships. We place export destinations into one of the six (6) continents: Africa, Europe, Asia, North America, South America and Oceania. Our survival estimates for the different continents are presented in Figure 4.6 which follows.

Figure 4.6: Kaplan-Meier Survival Estimates with respect to Different Geographic Regions



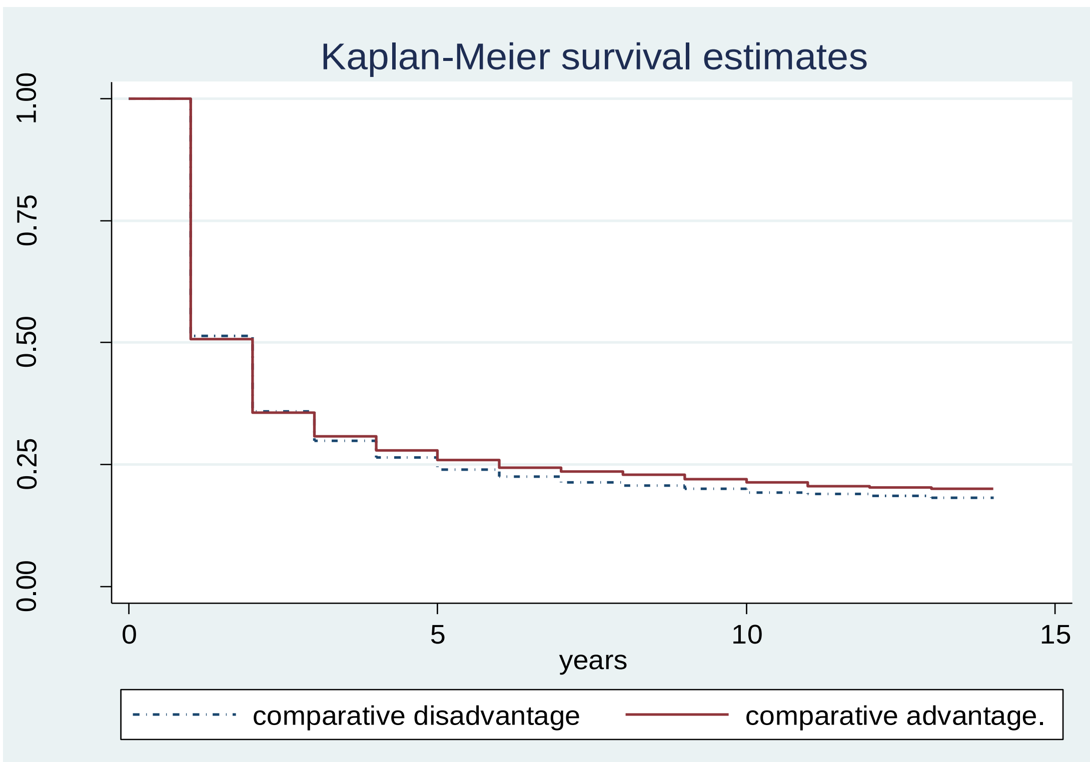
Our results in Figure 4.6 suggest that exports going to North American countries generally experience the highest survival rates and exports to African countries experience the worst survival rates. This is not surprising given that the United States of America being geographically close (and high income) is one of Trinidad and Tobago's main export markets. The low survival rates to African export destinations could be attributed to the fact that exporting to African countries takes place over relatively longer distances thus incurring higher trade costs. Therefore, distance may be having a dampening effect on export survival rates with respect to African countries. Also, many African countries are low income countries where the purchasing power to import goods are relatively lower. What is also evident from Figure 4.6, is that exports to South American countries, also geographically close to Trinidad and Tobago, rank second to

North America in term of survival rates. This result may also be largely attributed to the fact that exporting to South American countries takes place over relatively shorter distance, incurring lower trade cost thus increasing the prospects for survival. What is somewhat surprising is the relatively low survival rates among European countries given that Trinidad and Tobago's exports enjoy preferential access to many European countries. However, given that European countries are located further away, distance maybe having a damping effect on export survival to European countries. Also, given that European markets are high income and highly competitive, survival of exports in this type of environment is more difficult notwithstanding preferential access to these markets. In addition, it is possible, that although preferential arrangements exist in the European markets, these arrangements are not fully exploited by Trinidad and Tobago's manufactures. We also performed the Log-Rank test which strongly rejects the null hypothesis of equality of the various survival functions. Our general findings with respect to the export survival across different geographic regions are largely consistent with of those of Fonseca (2008) looking at the survival of Brazilian exports over the period 1989-2006.

4.4.10 Kaplan-Meier Survival Estimates and Comparative Advantage

We then attempted to consider whether comparative advantage is having any impact on Trinidad and Tobago's export duration. Following work by Jesson and Vignoles (2004) and Sinanan and Hosein (2012), we identify the two digit industries for which Trinidad and Tobago were reported to have comparative advantage. In both studies, the reveal comparative advantage (RCA) was used to measure comparative advantage. The study by Jesson and Vignoles (2004) look at Trinidad and Tobago's exports over the period 1998-2001, and that by Sinanan and Hosein (2012) look at Trinidad and Tobago's exports for the period 2006-2008. In both studies, two digit industries with a RCA greater than 1 are identified as industries for which Trinidad and Tobago enjoy a comparative advantage. Using the results of the both studies, 11 industries out of 61 are identified as industries in which Trinidad and Tobago enjoys a comparative advantage. We then created a dummy variable that is equal to 1 for industries where Trinidad and Tobago enjoys a comparative advantage and 0 otherwise. We subsequently estimate Kaplan-Meier survival functions to ascertain whether comparative advantage is having an impact on the export survival rates. The results are presented in Figure 4.7 below.

Figure 4.7: Kaplan-Meier Survival Estimates for Industries with Comparative Advantage and those with Comparative Disadvantage.



As shown in Figure 4.7 above, the survival rates for industries in which Trinidad and Tobago had a comparative advantage seem to experience marginally higher survival rates than those where a comparative disadvantage exists. This is particularly true after about the third year. Our initial results here are in line with our theoretical priors as we expect the duration of exports to be higher in industries where comparative advantage exist (see Jaud et al., 2010). However, when we perform the Log Rank test, the p-value is 0.54 suggesting that there are no significant differences between the survival rates of the two groups. In this regard, our results differ from studies such as Jaud et al. (2010) and Nicita et al. (2011). For example, Jaud et al. (2010), looking at the exports for 143 countries over the period 1995-2005, find that exports suffering from comparative disadvantage (e.g labour-intensive products from capital-abundant countries) survive shorter in the US market. Also, Nicita et al. (2011) looking at the exports from 17 least developed countries (LDCs) over the period 1993-2007, find that exported products that do not closely reflect a country's comparative advantage are likely to experience lower survival rates. While our results differ from some of the other studies, a possible reason for this difference may be due to some inherent problems of using the RCA as a measure of comparative advantage. In our analysis, Trinidad and Tobago only had a comparative advantage in 11 of the 61 industries. It is possible that some industries were wrongly classified as industries for which Trinidad and Tobago possess a comparative disadvantage when in fact comparative advantage exists. Strictly speaking, of course you ought to be expected to have exporting only in industries where comparative advantage exists.

4.5 Empirical Model Specification

In the previous section, we have been looking at survival and how survival rates change over time and across different types of trading partners. However, empirical models to assess what drives duration focus on the hazard rate, which is the opposite concept to the survival rate we have been discussing so far. The hazard rate is defined as the probability that a trade relationship stops after *t* periods, given that it has survived up to that point. To investigate the various factors influencing export duration, in line with several empirical studies, we use the Stratified Cox model (for example Nitch, 2009;

Shao et al, 2012).[6] A particular advantage of this modelling framework is that the baseline hazard function, $h_0(t)$, is unspecified, and this flexibility makes the Cox PH models the most widely used in survival analysis. The Stratified Cox model takes the following form:

$$h(t \mid X, Z = j) = h_j(t)\exp(x_m \beta) \qquad \textbf{4.6}$$

In the above specification,

- $h_j(t)$ represents the baseline hazard at a time *t*. It is the probability that a trade relationship stops after *t* periods, given it has survived up to that point.
- x_m denotes a vector of explanatory variables, while β represents the estimated coefficients. These covariates consist of standard gravity type variables, trade policy variables along with other controls such as multiple spell and initial export value. A covariate increases the hazard rate for a bilateral trade relationship if the estimated coefficient is positive, thus indicating the particular variable reduces the survival rate and *vice-versa*.
- *Z* is a secondary categorical predictor that we want to adjust for when making inferences about *X*'s relationship to the time-to-event endpoint, $j = 1, \ldots . C$ (number of levels in *Z*). This variable is the stratification variable(s) that is controlled for without estimating its values.

There are several factors that can affect the length of a bilateral trade relationship. In choosing the variables that might affect export duration, it seems reasonable to include some of the standard determinants of bilateral trade volumes. Following several

[6] The Cox PH model is a survival model that models the chances of an even occurring. In our case, the event is the occurrence of zero trade given that there was some trade before. The model relates the time that passes until the event to the covariates associated with it. The Stratified Cox Model is an extension of the Cox PH model.

empirical studies, we identify the following set of variables as likely candidates to influence the hazard rate (for example Besedeš and Prusa, 2006b; Besedeš, 2008; Brenton et al., 2009; Besedeš and Blyde, 2010):

First, we capture economic size of trading partners by including the gross domestic product of the export destination countries, (*GDP).* Indeed, we expect the duration of exporting to be longer the larger the export market. The rationale for this is that larger markets imply a larger number of buyers, therefore increasing the probability of finding and maintaining stable matches between exporters and importers (see Obashi, 2008; Jaud et al., 2009).[7]

Second, we control for the initial value of trade relationship with a variable denoted (*initial export value*). This variable captures the export value in the first year of the each spell. As argued by Rauch and Watson (2003), instead of starting a big order in the beginning, importers tend to place small ones so as to gauge the supplier's capability. Therefore, initial value can indeed be regarded as a signal, with larger values indicating more confidence in supplier's capability and increasing the likelihood of longer duration. Thus, we expect initial value to be negatively correlated with the hazard rate (see Besedeš and Prusa, 2006b; Obashi, 2008; Besedeš and Blyde, 2010; Jaud et al., 2010; Shao et al., 2012).

Third, we control for multiple spell by using a dummy variable, (*MultiSpell).* For a certain product-country trade spell, the dummy takes the value of 1 for spell number greater than 1 and zero otherwise. That is, the dummy only takes the value of 1 for higher order spells. This variable captures the experience in exporting. Besedeš and Prusa (2006b) and Obashi (2008) argue that, while on the one hand a first failure makes

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[7] Some studies also control for GDP per capita (proxy for level of economic development) with the expectation that the sign will be negative as well.

a second failure more likely resulting in a higher hazard, on the other hand, it is possible that the return of a foreign supplier to the market is a positive indication making a second failure less likely.[8] The effect of multiple spells on the hazard rate is thus expected to be ambiguous (see Jaud et al., 2009).

Fourth, we use two measures at the country-product level to capture information spillovers: one measures the number of products exported to the same country (*Number of export products*), while the other measures the number of countries to which the same product is exported (*Number of export markets*). The former measures experience with a country, while the latter measures experience with a product. Both variables are expected to reduce the hazard rate as the more diversified the export structure, the greater the chances to export a given product for long periods of time. A possible mechanism for this effect could be that firms in a country that export many products or trade with many other countries have access to more information about how to do business in foreign markets, which would facilitate exporting activities (see Nitch, 2009; Hess and Persson, 2011; Besedeš, 2012; Corcoles et al., 2012).

Fifth, we control for the influence of geographic and other factors by including some of the standard gravity covariates. We thus include the following variables: *Distance, Landlocked, Island*, *Common Colony* and *Common Language.* The rationale for the inclusion of these gravity covariates is that it is felt that these variables not only affect trade volume, but the occurrence of trade and thus its duration (see Obashi, 2008; Besedeš and Blyde, 2010; Fugazza and Molina, 2011). For instance, we expect distance to play a role as it increases the time and the costs of delivering products to markets. Also, the greater the distance covered by a shipment, the higher the chances of potential

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[8] Even if they have failed, past attempts make it possible to gather knowledge of export operations of specific products in each market. Since export costs are largely linked to the difficulties in obtaining relevant information, the capacity acquired in previous experiences will lower the uncertainty and cost of launching new trade relationships. Therefore, larger numbers of failure could result in greater expertise in specific markets thus reducing the hazard rate (Corcoles et al., 2012).

interruptions and delays which might prompt cancellation of subsequent orders. Further, greater distance reduces the knowledge of, and information on, export markets and reduces the amount of 'contacts' in the markets. Indeed, Anderson (2007) argues that the familiarity with the informal and formal institutions in adjacent markets is typically higher than in distant markets. In view of the foregoing arguments, we expect the hazard rate to increase with distance. Likewise, we expect Trinidad and Tobago's exporters to incur higher transactions cost with trade with landlocked countries, thus we expect Trinidad and Tobago's exports to landlocked countries to have higher hazard rate. Also, in line with the general prediction of gravity models where island countries are expected to trade more, we anticipate Trinidad and Tobago exports to island countries to face lower hazards. This is because trade with islands are expected to involve lower transactions costs. Moreover, we anticipate Trinidad and Tobago's exports to countries with which Trinidad and Tobago has a shared colonial history or which share common language are expected to incur lower trade cost and face lower hazards.

Sixth, we control for the effect of institutions by the inclusion of two institutional variables. The first institutional variable captures the effect of trade promotion by Trinidad and Tobago's Embassies and Consulates located in export destinations. To capture the effect of trade promotion, we use the per capita expenditure by government on Trinidad and Tobago's Diplomatic Missions and Consulates in the export markets. This variable is denoted *Promotions* and we expect its sign to be negative. The intuition is that the greater the per capita expenditure on promotion, the greater the information on markets in the export destination for potential exporters enabling them to better meet product specification requirements in the markets, thereby increasing the likelihood of finding and maintaining suitable export matches and increasing the export duration. As an alternative, we also used a dummy variable denoted *(DipMiss)* taking the value one if Trinidad and Tobago had an Embassy or Consulate established in the specific export destination in a given year and zero otherwise. Again, we expect the sign on this variable to be negative. The second institutional variable measures the quality of institutions and governance in the export destinations and is denoted *(Governance).* This variable was constructed as a composite index of six indicators of institutional quality from the World Bank Governance Indicators. It includes the following: Voice of Accountability, Political Stability, Governance Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. Each indicator captures some related aspects of the quality of institutions and governance. They either reflect the political process, the quality of the state apparatus and its policies, or the success of governance. The six governance indicators range in values from -2.5 to +2.5 with higher values corresponding to better governance outcomes. To construct the institutional variable, we take the simple arithmetic mean of the scores on of the six governance indicators. We know that the quality of institutions influence both the opportunities and the cost of trade and consequently influence the opportunities for export. Therefore, we expect "better" institutions in the export markets to result in less uncertainty about contract enforcement and general economic governance, thereby resulting in less transactions cost and increasing both trade and the duration of trade. Thus, we expect widely defined, good quality of institutions and governance to reduce the hazard of export relationships and the expected sign on this variable to be negative (see Obashi, 2008; **A**raujo and Ornelas, 2007; Brenton el al., 2009; Besedeš and Blyde, 2010; Corcoles et al., 2012; Araujo et al.,2012; Aeberhardt et al., 2012; Kamuganga, 2012).

And seventh, we include a number of trade policy variables. First, we capture the effect of preferential trade agreements with a dummy variable denoted *(CARICOM)*. This variable takes the value one if the export destination is a member of CARICOM and zero otherwise.[9] We know that trade agreements eliminate or reduce the cost of

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[9] *CARICOM* is defined to include Venezuela, Costa Rica, Dominican Republic and Cuba. Trinidad and Tobago by being a member of CARICOM also enjoys preferential access to these export markets via a number of bilateral agreements between CARICOM and these countries.

servicing an export destination imposed by tariffs and other trade barriers. In view of the cost advantages which the participation in preferential trading agreements offers to member countries, there is greater scope for profitable export transactions. Also, trade agreements restrict competition from countries outside the agreement thereby making trade relationships more profitable and stable. Moreover, we would expect trade with member countries to be more secure and less subjected to the risk entailed in uncertainty about economic policy and legal framework. We therefore expect the sign on *CARICOM* to be negative indicating that regional trade preferences reduce the hazard of trade relationships (Obashi, 2008; Besedeš and Blyde, 2010). Second, we capture the effect of WTO membership of trade partners with a dummy variable denoted *(WTO)* that is equal to 1 if the export destination is a member of WTO. As a sign of common trade rules and improvement in contract enforcement, we expect WTO membership to reduce the hazard of trade relationships through reducing uncertainty and building confidence in the export market (Shao et al., 2012). Third, we capture the effect of tariff by the average tariff in the export destinations for manufactured goods *(AvgTariff)*.[10] In general, we know that Trinidad and Tobago export goods to two types of markets: one in which there is preferential access and the other in which there are no preferential market access. In export markets where there is no preferential market access, exports from Trinidad and Tobago are subjected to the average tariff. In this regard, the higher average tariff will have a trade reducing effect. This will seek to increase the hazard of trade relationships. Comparatively, in export markets in which Trinidad and Tobago's products enjoy preferential access, it means that exports from other countries are subjected to the tariff in existence. Thus in this case, the higher the average tariff, the higher the margin of preferences Trinidad and Tobago's exports enjoys, this increases the competitiveness of a greater number of export products from Trinidad and Tobago relative to that from third countries. Thus, higher tariffs increase trade and will tend to

[10] We acknowledge there are some shortcomings with using average tariff given that our analysis is being conducted at the product level. Ideally, we would want to have the specific tariff rates applied for the various products in the different markets. However, acquiring this data could be quite burdensome.

reduce the hazard of a trade relationship. In general, the influence of the tariffs on the export hazard will depend on the relative strength of the two effects and thus the expected sign is ambiguous (see Besedeš and Prusa, 2006b; Hess and Persson, 2011).

4.6 The Data

4.6.1 Data Description and Sources

The description and sources of the various variables in our model is shown in Table A4-4 in the appendix. To construct our dependent variable, we use HS 6-digit manufacturing export data for the period 1996-2009. Our dataset consists of the exports of 1842 products to a total of 172 export destinations over the period of 14 years. It contains information on the year export occurred, the product code, the export destination country, the export value (in TT$) and was sourced from the Central Statistical Office, Government of Trinidad and Tobago. The list of export destinations are shown in Table A4-5 in the appendix. We were mindful that our duration results could be affected by changes in the classification of products (see Pierce and Schott, 2012). Indeed, the HS codes were revised in 1992, 1996, 2002 and 2007; however the actual implementation of the changes to the codes for Trinidad and Tobago occurred in the dataset in 1999, 2004 and 2007, respectively. Thus, for the period 1996-1998, HS 1992 is applicable; for the period 1999-2003, HS 1996 is applicable; for the period 2004-2006, HS 2002 is applicable; and for the period 2007-2009 HS 2007 is applicable. Thus, we adjusted our data to use consistent product codes over time using correlation tables available at the World Customs Organization (WCO) website to minimize problems associated with censoring due to the reclassification of products.[11] Notably, because Trinidad and

[11] See http://www.wcoomd.org/home_hsnomenclature_2012.htm.

Tobago has a relatively underdeveloped manufacturing sector, most codes present in our data are unaffected by classification changes. Also, because we are using HS 6-digit data and not a more disaggregated level such as HS 8-digit (which in the absence of classification changes would have been better to do duration analysis), we minimize measurement errors due to changes in product classification.

Turning to our explanatory variables, as shown in Table A4-4 in appendix, data on *(GDP)* (constant US$ 2005) for the period 1996-2009 were obtained primarily from the World Development Indicators of the World Bank (2010), and where necessary missing data supplemented from Penn World Tables (PWT 6.3). Data on *initial export value, MultiSpell, Number of export products* and *Number of export markets* were constructed by the authors using our export data obtained from the database of the Central Statistical Office (CSO) of Trinidad and Tobago. Also, data on *Distance, Common Colony, Common Language* and *Landlock* were obtained from *CEPII (Centre d'Estudes Prospectives et d'Informations)* website and data on *Island* were sourced from the CIA World Factbook. Moreover, we constructed *Promotions* and *DipMiss* using data obtained from the Administrative Reports of the Ministry of Foreign Affairs and Communications, Government of Trinidad and Tobago. In addition, *Governance* was constructed by the authors using data obtained from the Governance Indicators of the World Bank. Also, data for *CARICOM* were sourced from the Administrative Reports of the Ministry of Trade and Industry, Government of Trinidad and Tobago and that for *WTO* were obtained from the WTO website. Finally, data on *AvgTariff* were obtained primarily from the World Development Indicators of the World Bank (2010) and where necessary missing data supplemented from WITS websites.

4.6.2 Sample Characteristics

We present summary statistics of the various explanatory variables in the table below.

Table 4.7: Summay Statistics of Explanatory Variables (Benchmark Sample)

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
LnGDP	25210	23.130	3.188	19.951	30.209
LnDistance	27778	6.892	1.179	5.083	9.834
Common Language	29931	0.733	0.442	0	1
Landlocked	29931	0.009	0.093	0	1
Island	29931	0.645	0.478	0	1
Common Colony	29931	0.619	0.486	0	1
Log initial export value	29931	8.003	2.340	0	20.210
MultiSpell	29931	0.667	0.471	0	1
CARICOM	29931	0.588	0.492	0	1
AvgTariff	25240	10.608	6.848	0	74.690
WTO	29931	0.857	0.350	0	1
Governance	27364	0.593	0.667	-2.177	1.897
Log Promotions (-1)	29931	0.098	0.244	0	4.461
Number of export market	29931	4.416	3.734	1	38
Log number of export products	29931	4.309	0.995	0.693	5.673

Note: *Log Promotions (-1)* indicates a one period lag on *Log Promotions*.

The data in Table 4.7 above confirms that there is no major challenge with missing data with the explanatory variables in our sample. We also present the correlation matrix of all the explanantory variables in the model in Table A4-6 in the appendix. It is evident from the correlation matrix that several of the explanatory variables are highly correlated. For example, *LnGDP* is highly positively correlated with *LnDistance* and strongly negatively correlated with *Common Colony* and *CARICOM*. Also, *CARICOM* is highly negatively correlated with *GDP* and *Distance* and it is strongly positively correlated *Common Colony* and *Log no. of export products*. Similarly, *Log no. of export products* is strongly negatively correlated with *LnDistance* and strongly positively correlated with *Common Language*. The high correlation among some of our explanatory variables could result in bias and inconsistent coefficient estimates and this should be considered in our estimations.

4.7 Estimation Strategy and Issues

To estimate our model, in line with several empirical studies, we employed stratified Cox PH estimation (for example Nitch, 2009; Obashi, 2008; Besedeš; 2008; Fugazza and Molina, 2011; Shao el al, 2012). The stratified Cox PH estimation offers one major advantage in that it allows the form of the underlying hazard function to vary across levels of stratification variables. It therefore allows a factor to be adjusted for without estimating its effect and controls for some forms of unobserved heterogeneity (see Box-Steffensmeier and Zorn, 1998). To implement the stratified Cox estimation, we follow convention in the literature and use the six continents (regions) and 2-digit industries as our stratification variables (see Nitch, 2009; Shao et al., 2012).[12] Our stratification variables thus control for regional differences in the hazard rate as well as differences in the hazard rate across industries.

In applying our econometric estimations, there were several issues with which we had to deal. A critical issue was that of censoring: left and right censoring and censoring due to product reclassification. Because our data was adjusted (where we use consistent product codes overtime), we don't have a problem with censoring due to reclassification.

[12] Note that time varying covariates are merged in our dataset using their start year value of the respective variables.

In terms of right censoring, this is not a problem since the estimation technique uses the information on the time of survival up to the censoring point but does not make any inference about what happened to the spell subsequently. Left censoring is a more serious problem, and econometric techniques that deal with left censored spells efficiently, typically have to rely on some strong assumptions or supplementary data which is not available in our case. Therefore, we follow the convention in the literature and exclude left-censored observations from our dataset for our estimations.

The next three critical econometric issues pertain to the issue of endogeniety, the high correlation among some of our explanatory variables and unobserved heterogeneity. Our endogeniety concerns relate to our policy variable *Promotions.* As we indicated before, this variable captures the spending per capita by the Trinidad and Tobago government on Diplomatic Missions and Consulates in the export destinations. This variable is potentially endogenous as we expect the government of Trinidad and Tobago to set up and spend more per capita on Diplomatic Missions and Consulates in countries with which Trinidad and Tobago does significant trade and where trade lasts longer. We tried to reduce endogeniety concerns in our estimations by lagging this variable for different time periods. For a one period lag, the variable is denoted *Promotions (-1).* Moreover, it is evident from our correlation matrix that some of our explanatory variables are highly correlated. This has the potential to create bias and inconsistent coefficient estimates. To account for this, in some of our regressions we avoid the inclusion of highly correlated variables together. In addition, it is possible that there are country specific factors (export destination) that affect the duration of exports that are not captured in our model. This could possibly result in biased coefficient estimates due to unobserved heterogeneity. To minimize concerns of unobserved heterogeneity, we control for country fixed effects in some of our regressions.

Finally, a further issue we considered in our estimations pertains to possible bias resulting from the existence of export relationships with multiple spells. Implicity in our continuous time estimation, we assume that higher order spells are completely independent of previous ones. To the extent that this assumption does not hold, this could bias our estimation results. Thus, as part of our robustness checks, we estimate using the following alternative samples: (i) consisting of the first spell of each trading relationship (which includes relationships with just a single spell and the first spell of multi-spell relationships; (ii) consisting of relationships which have only a single spell; and (iii) combining one-year gaps between spells to form longer spells under the assumption that small gaps have been misreported (longer gaps are assumed to be correct and are not adjusted for). Also, our model includes a dummy that controls for the impact of export spells that reappear. Further, to check whether our results are driven by the prevalence of many small value transactions, in some regressions we drop spells with initial trade values below a certain threshold level.

4.8 Empirical Results

In this section, we present the empirical results for our Stratified Cox estimation along with several robustness checks. In all our regressions the dependent variable is the hazard rate and is defined as the probability of export products from Trinidad and Tobago existing in related export markets. For our benchmark results, we use regions and 2-digit industries as our stratification variables. As part of our robustness checks, we consider the possible effect of the strong correlation of some of our explanatory variables, country fixed effects, endogeniety, sample splitting as well as an alternative estimation technique. Unless otherwise stated, all out results are based on our benchmark dataset. We follow convention in much of the literature and exclude left censored observations from our benchmark dataset.[13]

[13] We also estimate the model using the original dataset (not adjusted for left censoring) and our results are unaffected.

4.8.1 Benchmark Results

Benchmark results for our Stratified Cox estimation are presented in Table 4.8 below.

Table 4.8: Stratified Cox Estimation Results (Benchmark Specification)

VARIABLES	Hazard Rate
LnGDP	-0.0238***
	(0.00476)
LnDistance	0.159***
	(0.0104)
Common Language	-0.118***
	(0.0180)
Landlocked	-0.0607*
	(0.0358)
Island	0.0810***
	(0.0178)
Log initial export value	-0.0508***
	(0.00217)
MultiSpell	0.0485***
	(0.0114)
CARICOM	-0.0758**
	(0.0307)
AvgTariff	-0.00305***
	(0.000831)
WTO	-0.286***
	(0.0608)
Governance	0.0252**
	(0.0114)
Log Promotions (-1)	-0.0633***
	(0.0244)
Number of export markets	-0.0539***
	(0.00185)
Log number of export products	-0.0584***
	(0.00915)
Stratification Variables	Region, 2-digit industries
Observations	24,519

Notes: The dependent variable is the hazard rate. A positive sign on the coefficient signifies an increase in the probability of an export relationship failure (increase in the hazard rate) and vice-versa. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Estimations are done using benchmark dataset.

Looking at Table 4.8, it is evident that the signs on the standard gravity covariates are generally in line with our apriori expectations and consistent with several empirical studies on export duration. To illustrate, we find *GDP* negative and highly significant, suggesting that export duration is longer to larger export destinations. The magnitude of the coefficient suggests that a 100% increase in *GDP* reduces the hazard rate by about 2%.[14] We expect duration to be longer in larger markets because the larger markets, the larger the number of potential buyers (greater purchasing power) and this increases the probability of exporters finding and maintaining suitable matches. Our findings in this regard are both in line with our theoretical priors and consistent with those of several empirical studies (see Besedeš and Prusa, 2006b; Besedeš, 2008; Brenton et al., 2009; Fugazza and Molina, 2011; Hess and Persson, 2011; Shao et al., 2012; Besedeš, 2012).[15] Also, we find the coefficient on *LnDistance* positive and significant suggesting that greater distance from export markets reduces export duration. The magnitude of the coefficient suggests that doubling distance between trading partners result in increase in the hazard rate by about 17%. Again, our results here are in keeping with our theoretical priors and corroborate those of several other empirical studies (see Obashi, 2008; Besedeš, 2008; Brenton et al., 2009; Besedeš and Blyde, 2010; Fugazza and Molina, 2011; Nicita et al., 2011; Shao et al., 2012). We expect trade costs to be higher to more distant export destinations, thus increasing the difficulty of finding and maintaining a proper match. Further, our coefficient on *Common Language* are negative and highly significant, suggesting that export duration is longer with export destinations where English is the main official language spoken. The magnitude of our coefficient suggests that the hazard rate is 12% lower for trade with partner countries where English in the main language. We expect trade with countries where the official language is similar to that of Trinidad and Tobago to involve lower transactions costs, making trade relationships less vulnerable to negative shocks that increase the likelihood of failure. Thus, our results confirm our apriori expectation and is consistent with several empirical papers (for example, Obashi, 2008; Besedeš, 2008; Besedeš and Blyde, 2010; Hess and Persson, 2011; Nicita et al., 2011). Two somewhat surprising findings pertain to our

[14] We calculate the effect of the coefficients on the hazard rate by exponentiating the parameter estimates to obtain hazard ratios. A hazard ratio greater than 1 indicates an increase in the hazard and shorter duration and *vice-versa*.
[15] We also tried specifications including *LnGDPpc* and our results were largely unaffected.

results with respect to both *Landlocked* and *Island*. We find the sign on *Landlocked* negative and moderately significant, suggesting that exporting to landlocked countries result in lower hazard. The magnitude of the coefficient suggests that the hazard rate is approximately 6% lower for trade with landlocked partner countries. This seems counterintuitive as we expect trade with landlocked countries to incur higher transactions costs, thus increasing the difficulty of finding and maintaining a proper match thus increasing the hazard rate. One reason for this seemingly perverse result is the fact that trade cost is higher in landlocked countries, so once a trade relationship is established; other potential competitors are deterred from entering the market which is "naturally protected" by the high trade cost. Thus, once a trade relationship is established with a landlocked trading partner, it tends to last longer. Our finding with respect to this specific variable differs from Fugazza and Molina (2011) and Shao et al., (2012) which both report positive signs on this coefficient. Also, we find the coefficient on *Island* to be positive and highly significant, suggesting that the duration of exports to countries that are islands is shorter. The magnitude of the coefficient suggests that trade with countries that are islands results in an 8% higher hazard. Our apriori expectation is that trade with islands will incur lower transactions costs thus reducing the difficulty associated with finding and maintaining a proper match and reducing the hazard rate. Therefore, our results with respect to *Island* seem counterintuitive. A possible explanation for this seeming counterintuitive result is the fact that islands tend to be small countries with low trade costs, thus once a trade relationship is established with an island, it easier for third party exporter countries to enter the export market (with lower trade costs), thus competition in these markets (islands) are higher and trade relationships could face a greater hazard.[16]

Turning our attention to the variables capturing spell characteristics, we find the coefficient on *MultiSpell* positive and significant, suggesting that the existence of a first

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[16] We exclude *Common Colony* from our model because it is highly correlated with several of our explanatory variables.

failure makes other failures more likely resulting in higher hazard and thus shorter export duration. Intuitively, what this means is that the risk of failure is higher for export products that frequently exit and re-enter specific export markets. The magnitude of the coefficient suggests that hazard rate is up to 5% higher for trade relationships involving multiple spells. While our results here differ from Brenton et al. (2009) and Shao et al. (2012), they are consistent with the findings of several empirical studies (for example, Besedeš and Prusa, 2006b; Besedeš, 2008; Jaud et al., 2010; Nicita et al., 2011). Also, with respect to *Log initial export value*, we find the coefficient on this variable negative and highly significant, suggesting that trade relationships with larger initial export values are longer. The size of the coefficient suggests that a 100% increase in initial export value lowers the hazard rate by about 5%. Our results confirm the prediction of Rauch and Watson (2003) which suggest that a higher initial trade value is a proxy for more confidence (trust) and less uncertainty, thus ensuring a longer and more stable trade relationship. Also, as Nitsch (2009) and Shao et al. (2012) argue, a larger initial value is a sign of major bilateral trade linkage, which is more likely to remain longer. Our results confirm those of several empirical studies (see Obashi, 2008; Brenton et al., 2009; Besedeš and Blyde, 2010; Nicita et al., 2011; Shao et al., 2012).

Turning our attention to our main trade policy variables, we find the coefficient on *CARICOM* negative and significant, suggesting that regional integration with trading partners increase export duration. The magnitude of the coefficient on this variable suggests that the hazard rate is about 7% lower for trade with CARICOM partners. Our results are not surprising as trade agreements generally eliminate or reduce the cost of servicing export destinations imposed by tariffs and other barriers and increase the likelihood of profitable export transactions. Thus, we expect regional integration with trading partners to increase export duration. Our findings here corroborates those of several other empirical studies that suggests trade preferences increase trade duration (see Besedeš and Blyde, 2010; Hess and Persson, 2011; Besedeš, 2012). Similarly, we find the coefficient on *AvgTariff* is negative and highly significant, indicating that the higher the average tariff in the export destination, the longer is the duration of exports. The size of the coefficient suggests that a 1% increase in the average tariff of trading partners reduces the hazard rate by about 0.4%. Our results seem plausible and it maybe capturing the effect of preferential treatment of Trinidad and Tobago exports. Notably, in the markets in which Trinidad and Tobago's exports have preferential access, higher tariffs indicates higher margins of preferences (as exports from third countries are subjected to the high tariffs) thus increasing the competiveness of a greater number of products and increasing the likelihood and the duration of profitable export relationships. Our results in this regard are consistent with those of Besedeš and Prusa (2006b). Also, we find the coefficient on the variable *WTO* negative and highly significant, suggesting that WTO membership of trading partners increases export duration. The magnitude of the coefficient suggests that trade with WTO member countries involve up to a 25% lower hazard. Again, our results seem quite plausible as we expect trade with WTO member countries to involve less uncertainty and more stable trade relationships. Our findings here are in line with those of Shao et al. (2012).

Looking at our institutional variables, we find the coefficient on *Governance* positive and significant; suggesting that improved institutional quality and governance in export markets reduces export duration. The magnitude of the coefficient suggests that a one-unit improvement in institutional quality and governance increases the hazard rate by up to 3%. Our results with respect to this variable seem somewhat surprising as we expect better governance and institutional quality in export markets to result in less uncertainty about contract enforcement and in longer export duration. Our results in this regard differ from those of Besedeš and Blyde (2010), who find a negative and significant relationship between the rule of law and the hazard rate. One reason for our different results could be due to the differences in the proxy used to capture institutional quality. While we use a composite index to capture institutional quality and governance, Besedeš and Blyde (2010) capture institutional quality and governance with rule of law (a component of our index). Thus, by using the composite index, we may be masking some of the heterogeneity with respect to the various subcomponents of institutional quality. Alternatively, it may be that export markets with better governance exhibits greater efficiencies in production and therefore import less and the duration of exports to these markets are shorter. Also, it may be that competition in these markets is greater, thus export relationships face greater hazards. It is therefore possible that our institutional quality variable is really capturing greater efficiencies in production and greater competitiveness in larger export markets with better institutions. Moreover, consistent with our apriori expectations, we find the coefficient on *Promotions (-1)* negative and highly significant. Our results thus suggest that the more Trinidad and Tobago spends per capita on Diplomatic Missions and Consulates (trade promotions) in the export markets, the longer the duration of export.[17] The size of the coefficient indicates that doubling the spending per capita on Diplomatic Missions and Consulates (trade promotions) by Trinidad and Tobago in export markets reduces the hazard rate by about 6%. Notably, we lag this variable one period to reduce endogeniety concerns. Our results in this regard seem quite plausible given that these institutions sometimes play a critical role in the promotion of trade. Thus, greater spending per capita on these institutions are expected to yield better information on markets and enable potential exporters to meet the product specification in the various export markets. Therefore, we expect that the higher the per capita expenditure by Diplomatic Missions and Consulates (the greater the spending per capita on trade promotions), the greater the likelihood of finding and maintaining suitable export matches, and the longer the export duration.

Focusing on our variables capturing information spillovers (diversification), we find *number of export markets* and *log number of export products* negative and highly

[17] In an alternative regression, we tried using a dummy variable, *DipMiss,* which captures whether or not Trinidad and Tobago operated a Diplomatic Mission or Consulate in specific export markets in given years rather than *Log Promotions (-1*). Our results are unaffected when we include this alternative variable in our specifications.

significant. This suggests that exporting to many markets and exporting many products increases export duration. This seems plausible as we expect the more diversified a country's export structures, the greater the chances to export a given product for long periods of time. The intuition behind this is that a country that exports many products to the same market or trade the same product with many other countries has access to more information on how to do business in foreign markets, which will facilitate exporting activities. The magnitudes of the coefficients suggest that a 100% increase in the number of export products reduces the hazard rate by about 6 %, and a one-unit increase in the number of export markets reduces the hazard rate by about 5%. Our results in this regard are in line several empirical studies (for example, Hess and Persson, 2011; Nicita et al., 2011; Kamuganga, 2012; Besedeš, 2012).

4.8.2 Robustness Checks

High Correlation of Explanatory Variables

As part of our robustness checks, we examine whether our results are driven by the high correlation of some of our explanatory variables. In this regard, we conduct our estimations excluding (in turn) certain highly correlated explanatory variables (such as *GDP, CARICOM* and *Log number of export products*) and we compare our results with our benchmark results. The estimation results are presented in the table which follows.

Table 4.9: Stratified Cox Estimation Results with some specifications accounting for the high collinearity between some explanatory variables.

VARIABLES	(1) Benchmark Specification Hazard Rate	(2) Excluding *GDP* Hazard Rate	(3) Excluding *CARICOM* Hazard Rate	(4) Excluding *Log number of export products* Hazard Rate
LnGDP	-0.0238***		-0.0144***	-0.0380***
	(0.00476)		(0.00290)	(0.00419)
LnDistance	0.159***	0.138***	0.155***	0.188***
	(0.0104)	(0.00944)	(0.0104)	(0.00934)
Common Language	-0.118***	-0.115***	-0.125***	-0.160***
	(0.0180)	(0.0182)	(0.0178)	(0.0167)
Landlocked	-0.0607*	-0.00949	-0.0472	-0.0616*
	(0.0358)	(0.0351)	(0.0354)	(0.0368)
Island	0.0810***	0.0849***	0.0798***	0.0830***
	(0.0178)	(0.0177)	(0.0178)	(0.0178)
Log initial export value	-0.0508***	-0.0511***	-0.0511***	-0.0501***
	(0.00217)	(0.00217)	(0.00216)	(0.00216)
MultiSpell	0.0485***	0.0423***	0.0467***	0.0476***
	(0.0114)	(0.0114)	(0.0114)	(0.0114)
CARICOM	-0.0758**	0.0310		-0.162***
	(0.0307)	(0.0189)		(0.0274)
AvgTariff	-0.00305***	-0.00266***	-0.00334***	-0.00266***
	(0.000831)	(0.000838)	(0.000820)	(0.000825)
WTO	-0.286***	-0.264***	-0.280***	-0.276***
	(0.0608)	(0.0599)	(0.0612)	(0.0619)
Governance	0.0252**	-0.00297	0.0208*	0.0235**
	(0.0114)	(0.0111)	(0.0114)	(0.0115)
Log Promotions (-1)	-0.0633***	-0.103***	-0.0823***	-0.0412*
	(0.0244)	(0.0239)	(0.0235)	(0.0244)
Number of export markets	-0.0539***	-0.0524***	-0.0536***	-0.0546***
	(0.00185)	(0.00184)	(0.00185)	(0.00186)
Log number of export products	-0.0584***	-0.0732***	-0.0679***	
	(0.00915)	(0.00808)	(0.00813)	
Stratification Variables	Region, 2-digit industries	Region, 2-digit industries	Region, 2-digit industries	Region, 2-digit industries
Observations	24,519	25,124	24,519	24,519

Notes: The dependent variable is the hazard rate. A positive sign on the coefficient signifies an increase in the probability of an export relationship failure (increase in the hazard rate) and vice-versa. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0. Estimations are done using benchmark dataset.

It is evident from Table 4.9, that our results are not only consistent with each other, but with our previous results in Table 4.8, revealing the robustness of most factors affecting the hazard rate. Thus, it is reasonable to conclude that our results seem to be unaffected by the high correlation of some of our explanatory variables. However, two minor differences seem noteworthy. First, *CARICOM* turned out insignificant in specification (2). Second, the variable *Governance* in specification 2 is not significant.

Country Fixed Effects

We are cognizant of the fact that our results may have been influenced by the omission of export destination variables that can influence export duration. Thus, to better control for possible unobservable export destination characteristics that may affect the duration of exports, we estimate the model with the inclusion of country (importer) fixed effects.[18] Therefore, we repeat our estimations from Table 4.9, this time including country fixed effects. The results of our estimations are presented in Table 4.10 which follows.

[18] Since we only have importer variation, we are only able to control for importer characteristics.

Table 4.10: Stratified Cox Estimation Results with some specifications accounting for the high collinearity between some explanatory variables, with country fixed effects.

VARIABLES	(1) Benchmark Specification Hazard Rate	(2) Excluding *GDP* Hazard Rate	(3) Excluding *CARICOM* Hazard Rate	(4) Excluding *Log number of export products* Hazard Rate
LnGDP	-0.273***		-0.273***	-0.278***
	(0.0505)		(0.0505)	(0.0499)
Ln initial export value	-0.0498***	-0.0501***	-0.0498***	-0.0497***
	(0.00219)	(0.00220)	(0.00219)	(0.00219)
MultiSpell	0.0548***	0.0538***	0.0548***	0.0553***
	(0.0116)	(0.0116)	(0.0116)	(0.0116)
CARICOM	-1.450***	-1.023***		-1.488***
	(0.262)	(0.248)		(0.254)
AvgTariff	-0.00674***	-0.00294***	-0.00674***	-0.00679***
	(0.00109)	(0.000996)	(0.00109)	(0.00109)
WTO	-0.654***	-0.775***	-0.654***	-0.656***
	(0.214)	(0.221)	(0.214)	(0.215)
Governance	0.00424	0.0262	0.00424	0.00536
	(0.0329)	(0.0324)	(0.0329)	(0.0328)
Log Promotions(-1)	-0.518***	-0.591***	-0.518***	-0.513***
	(0.0694)	(0.0675)	(0.0694)	(0.0689)
Number of export markets	-0.0564***	-0.0555***	-0.0564***	-0.0566***
	(0.00186)	(0.00186)	(0.00186)	(0.00185)
Log number of export products	-0.00937	-0.00433	-0.00937	
	(0.0142)	(0.0142)	(0.0142)	
Country Fixed Effects	Yes	Yes	Yes	Yes
Stratification Variables	Region, 2-digit industries	Region, 2-digit industries	Region, 2-digit industries	Region, 2-digit industries
Observations	24,519	25,124	24,519	24,519

Notes: The dependent variable is the hazard rate. A positive sign on the coefficient signifies an increase in the probability of an export relationship failure (increase in the hazard rate) and vice-versa. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Estimations are done using benchmark dataset.

As seen in Table 4.10, not only are our results consistent with each other but with our pervious results in Table 4.9, as well as our other results. Again, this suggests that our results are robust to the inclusion of country fixed effects. Notably, three differences seem evident. First, while the sign and significance of the explanatory variables were largely unaffected, with the inclusion of country fixed effects, the magnitude of some coefficients is now larger. Second, the variable *Log number of export products,* though still negative in all specifications, loses its significance in all regressions. Third, the variable *Governance* is now not significant in any regression.

Further Minimizing Endogeniety Concerns

Notwithstanding the fact that in our previous regressions we lag (one period) our trade promotions variable, we are mindful of the fact that our results may have been influenced by the possible endogeniety of the variable *Log Promotions (-1*). It may have been that Trinidad and Tobago set up Embassies and High Commissions and consequently spend more per capita in export markets in which Trinidad and Tobago does substantial exports. Thus, export duration would be longer in these markets. As a check to examine whether our results are influenced by the possible endogeniety of *Log Promotions (-1*), we seek to lag the variable 4-periods rather than one period and examine the results. We subsequently re-estimate the models in Table 4.10, this time lagging our variable capturing per capita expenditure on Diplomatic Missions and Consulates for four periods rather than one. Our results using of *Log Promotions (-4*) are presented in Table 4.11 below.

Table 4.11: Stratified Cox Estimation Results with some specifications accounting for the high collinearity between some explanatory variables, with country fixed effects and 4 period lags on *Log Promotions.*

VARIABLES	(1) Benchmark Specification Hazard Rate	(2) Excluding *GDP* Hazard Rate	(3) Excluding *CARICOM* Hazard Rate	(4) Excluding *Log number of export products* Hazard Rate
LnGDP	-0.613***		-0.613***	-0.607***
	(0.0586)		(0.0586)	(0.0583)
Log initial export value	-0.0406***	-0.0417***	-0.0406***	-0.0408***
	(0.00244)	(0.00245)	(0.00244)	(0.00243)
MultiSpell	-0.108***	-0.105***	-0.108***	-0.109***
	(0.0123)	(0.0124)	(0.0123)	(0.0123)
CARICOM	-2.223***	-1.034***		-2.056***
	(0.171)	(0.175)		(0.431)
AvgTariff	-0.00356***	0.000304	-0.00356***	-0.00349***
	(0.00117)	(0.00116)	(0.00117)	(0.00117)
WTO	-0.513**	-0.799***	-0.513**	-0.511**
	(0.238)	(0.255)	(0.238)	(0.235)
Governance	0.0604	0.0325	0.0604	0.0588
	(0.0406)	(0.0407)	(0.0406)	(0.0406)
Log Promotions (-4)	-1.235***	-1.434***	-1.235***	-1.238***
	(0.119)	(0.120)	(0.119)	(0.119)
Number of export markets	-0.0441***	-0.0438***	-0.0441***	-0.0441***
	(0.00228)	(0.00230)	(0.00228)	(0.00228)
Log number of export products	0.0237	0.0416**	0.0237	
	(0.0180)	(0.0182)	(0.0180)	
Country Fixed Effects	Yes	Yes	Yes	Yes
Stratification Variables	Region, 2-digit industries	Region, 2-digit industries	Region, 2-digit industries	Region, 2-digit industries
Observations	18,952	19,557	18,952	18,952

Notes: The dependent variable is the hazard rate. A positive sign on the coefficient signifies an increase in the probability of an export relationship failure (increase in the hazard rate) and vice-versa. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Estimations are done using benchmark dataset.

As shown in Table 4.11, not only are our results consistent with each other, but also with our previous results in Table 4.10 as well as our other results. What seems evident is that our results remained robust even when we account for possible endogeniety with one of our explanatory variables. However, three small differences are noticeable from our results in Table 4.10. First, our coefficients generally increase in magnitude. Two, *AvgTariff* is now positive but insignificant in column 2. Three, the variable *Log numbers of export products*, is now positive and significant in column 2. This result is somewhat surprising and seems to be counterintuitive.

Sample Splitting

Given possible measurement errors caused by multiple spells and data misreporting, we check the robustness of our results by splitting our benchmark sample and estimating using the following alternative sub-samples: (i) consisting of relationships which have only a single spell; (ii) consisting of the first spell of each trading relationship (which includes relationships with just a single spell and the first spell of multi-spell relationships; (iii) combining one-year gaps between spells to form longer spells under the assumption that small gaps have been misreported (longer gaps assumed to be correct and are not adjusted for); and (iv) consisting of spells from our benchmark sample with initial export values greater than $10,000TT. In the case of the later sub-sample our objective is to check whether our results are driven by the prevalence of small value transactions. We estimate our fixed effect specification using the aforementioned sub-samples and our results are presented in Table A4-7 and Table A4-8 in the appendix. Again, the results for our sub-samples are in general consistent with each other and with our previous results. Focusing on Table A4-7, we observe most of our explanatory variables have the expected signs and significance. The only anomaly is that when we use our sample with gap adjusted spells (column 4), the coefficient on *LnGDP* turns positive and highly significant and that on *MultiSpell* turns negative and significant. These specific results seem counterintuitive and inconsistent with our other results. However, we are comforted by the fact that by using the gap adjusted sample, we are really making a strong assumption about the absence of the gaps in the case of one year gaps between spells. To the extent that these one-year gaps are “true” gaps, this could generate possible bias in our estimation results. What is also comforting is that when we seek to minimize endogeniety concerns by using *Log Promotions (-4)* rather than *Log Promotions (-1*) in Table A4-8, although the sign on *LnGDP* remains positive, the variable loses its significance in the gap adjusted sample. All our other results are generally in line with our pervious results.

Alternative Estimation Technique

Finally, we estimate our model using an alternative estimation technique. Specifically, we estimate our regressions using the exponential model, which like the Stratified Cox model, is a continuous time model that to some extent accounts for unoberserved heterogeneity. The model is specified as: $h(t)=exp(x_m\ \beta)\mu$, where μ is a stochastic variable standing for unobserved heterogeneity, and all other terms in the model are defined as in equation 4.6. The results of our exponential estimations for selected specifications are presented in Table A4-9 in the appendix. It is again evident that not only are our results consistent with each other, but with our previous results using the Stratified Cox estimation. Again, this confirms the roboustness of most of the factors affecting the hazard rate. The only dissimilarity exists with respect to the variable *Governance* which is negative and highly signifincant in columns 1 and 2, but positive and moderately significant in column 4.

4.9 Conclusions

In this chapter, we set out to measure Trinidad and Tobago’s export duration and to examine the factors influencing it. As it pertains to the measurement of export duration, we find consistent with the findings of several empirical studies, that Trinidad and

Tobago's export duration is extremely short. For our benchmark sample, the mean duration is 2.34 years and the median is 1 year. As it pertains to the factors influencing export duration, several interesting findings emerged from our study. For example, we find strong support for size (larger *GDP)* in export destinations increasing export duration and greater distance from markets reducing export duration. In addition, we find substantial evidence that Trinidad and Tobago's export duration is longer in export markets where English is the official language. Also, we find significant evidence that the duration of trade relationships with larger initial values at the start of spells lasts longer thereby confirming the predictions of Rauch and Watson (2003). Further, we unearth substantial evidence that regional integration with and WTO membership of trading partners increases export duration. Relatedly, we discover strong evidence that trade duration is longer in export markets with higher tariffs. Notably, in one of our most interesting result, we find robust evidence that trade promotion as measured by the spending per capita by Trinidad and Tobago's government on Diplomatic Missions and Consulates in export destinations, stimulates longer export duration. A surprising finding in our study is that improved institutional quality and governance in export markets, reduces export duration. Rather that capturing the effect of institutions, our institutional quality and governance variable may be capturing stronger competitiveness in larger economies. This result we may want to subject to more robust examination in our future work by looking at the behavior of various subcomponents of governance rather than an overall index (average). We are somewhat comforted by the fact that our surprising results with respect to our institutional quality and governance variable are not robust to the inclusion of country fixed effects. Finally, we find strong evidence that exporting many products to the same market and exporting the same product to many markets increases export duration. Our results in general seem to be in line with our theoretical priors and consistent with the findings of several empirical studies.

Our results contain several important policy messages. Notably, the fact that exports duration is short suggests that, if policy makers (in Trinidad and Tobago) want to stimulate export growth, more concerted efforts must be made to address the issue of export survival. Notwithstanding other efforts to stimulate exports, policy makers need to mindful of the fact that exports will not grow very much if new products stop being exported after a few years. Thus, the export promotion strategy must not only focus on expanding intensive and extensive margins but on the issue of export survival. This is of vital importance given that export-led growth has been and continues to be an important economic developmental strategy of Trinidad and Tobago as well as many other developing countries. Indeed, any export-led growth strategy that focuses only on entry into exporting or export deepening will miss fundamental aspects of the dynamics of exporting and the overall success of such a strategy could be compromised. Also, our results with respect to common language enhancing duration, suggest that if policy makers in Trinidad and Tobago want to achieve their stated objective to expand trade in the large (and nearby) South and Central American market (where Spanish is the official language), a programme to boost the ability of Trinidad and Tobago's citizens to communicate in Spanish could prove to be beneficial. In addition, our results with respect to CARICOM suggest that regional integration is beneficial to Trinidad and Tobago's manufacturing exports and efforts to strengthen regional integration should be encouraged. In this regard, further CARICOM-Bilateral agreements with other neighbouring countries such as Guatemala and Panama could prove benefitial to participating countries. Moreover, our results with respect to the impact of trade promotions suggest that Trinidad and Tobago could boost manufacturing exports by enhancing the trade facilitation role played by Embassies and Consulates.

Our work contributes to several strands of the literature on international trade. In general, the major contribution of our work is that we provide fresh evidence on the impact of a wide range of trade policy variables and institutional factors on export duration. For example, we provide fresh evidence on how export promotion affects the duration of trade. Our work ties in nicely with a broader literature that looks at how trade promotion institutions affect, not only trade volume, but also the margins of trade (see Rose, 2007). Our work also fits in to the ongoing debate on how WTO membership influences trade (see Rose, 2004). Another key contribution is that we address the paucity of literature looking at the factors affecting export duration in the context of a small industrialising economy.

Notably, there are some limitations of our work that suggest the need for further research. For example, to capture trade costs, one of the variables we use is the average tariff applied in the export destination. Ideally, we would have liked to have the product specific tariff applied in each market, however, the data requirements for this is quite burdensome. This is something we hope to address in future work. Also, we ignored non-tariff barriers which could have a significant role in explain trade duration. Finally, another limitation pertains to our use of the continuous time model (Stratified Cox Model). By construction, these models are unable to accommodate variations within spells of our time varying covariates. This is because the data is organized one spell per row. Moreover, despite the overwhelming popularity of the Cox estimation framework, there has been some recent criticism leveled at the procedure for analysing trade duration by Hess and Persson (2012). They argue that trade data consist of "tied" durations: exports that die in the month of January are recorded dying the same year as ones that die in December. As a consequence, many trade relations are observed to be equal length and no "natural" way exists to treat such tied duration times within the Cox framework. Second, unobserved heterogeneity (also known as frailty) is better dealt with using discrete-time models. They argue that the Stratified Cox models can address, to some extent, aspects of unobserved heterogeneity by allowing baseline hazards to vary within observations or by including country dummies. They propose that estimation be done using the discrete models such as probit, logit or cloglog models. In our future works, to better accommodate time varying covariates and to take onboard the recent criticism leveled against continuous models by Hess and Persson (2012), we propose to estimate using discrete models. In order to further minimize endogeniety concerns, we will explore the possibility of finding a suitable instrument for instrumenting our trade promotions variable within the discrete framework. In this regard, a technique such as the ivprobit is of definite interest.

Appendix A4

Table A4-1: Data Structure for Continuous-Time Survival Analysis

Spell ID	Spell Length (years)	Censor	Spell Start	Spell End	Export Destination	HS Code	Product
1	2	1	2008	2009	Canada	664260	Glass
25	3	0	1999	2001	China	651450	Textile

Table A4-2: Data Structure for Discrete-Time Survival Analysis

Spell ID	Death	Spell Start	Spell End	Export Destination	HS Code	Product	Year	Covariate
1	0	2008	2009	Canada	664260	Glass	2008	X
1	0	2008	2009	Canada	664260	Glass	2009	X
25	0	1999	2001	China	651450	Textile	1999	X
25	0	1999	2001	China	651450	Textile	2000	X
25	1	1999	2001	China	651450	Textile	2001	X

Notes: Table A4-1 shows the structure of the continuous time data. In order to do discrete-time survival analysis, the continuous-time data must be organized to suite discrete-time model. As shown in Table A4-2, each export spell is expanded so that for every spell there are as many observations as there are time periods. Thus, an export spell that is three years long is accorded three rows of data with binary dependent variable (death) equal to zero for all years when the export is active or is right censored- and one for the last year of the spell when the flow ceases. You then create duration-interval specific dummy variables for each year that allows you to incorporate both the time invariant and the time varying covariates.

Table A4-3: Spell Lengths and Frequency, Benchmark Sample.

Spell Length (years)	Frequency	Percentage	Cumulative Frequency
1	23,987	63.94	63.94
2	5,495	14.65	78.59
3	2,519	6.71	85.3
4	1,163	3.1	88.4
5	803	2.14	90.54
6	533	1.42	91.96
7	411	1.1	93.06
8	325	0.87	93.93
9	254	0.68	94.6
10	229	0.61	95.21
11	498	1.33	96.54
12	135	0.36	96.9
13	152	0.41	97.31
14	1,011	2.69	100
Total	**37,515**	**100**	

Table A4-4: Description and Sources of Variables.

Variable	Description	Sources
Export	HS 6-digit manufacturing export, 1996-2009.	Central Statistical Office (CSO), Trinidad and Tobago.
LnGDP	Natural log of Gross Domestic Product (constant US$ 2005)	World Development Indicators of the World Bank (2010) and Penn World Tables (PWT 6.3).
CARICOM	Dummy variable equal to 1 when export destination join CARICOM	Administrative Reports of the Ministry of Trade and Industry, Government of Trinidad and Tobago.
AvgTariff	Average MFN tariff for manufactured goods applied in each export market.	World Development Indicators of the World Bank 2010 and WITS websites
WTO	Dummy variable equal to 1 when export destination join WTO	WTO website
DipMiss	Dummy Variable equal to one when Trinidad and Tobago established an Embassy or a Consulate in the export market	Administrative Reports of the Ministry of Foreign Affairs and Communication, Government of Trinidad and Tobago
Log Promotions	Log expenditure per capita by government of Trinidad and Tobago on Diplomatic Missions and Consulates in each export market.	Calculated by authors using data from Administrative Reports of the Ministry of Foreign Affairs and Communication, Government of Trinidad and Tobago; and, World Development Indicators of the World Bank (2010).
Governance	Summary Index of Governance (include Voice Accountability, Political Stability, Government Effectiveness, Control of Corruption, Regulatory Quality and Rule of Law	Worldwide Governance Indicators by World Bank (2010)
Log initial export value	Log of the initial value of export at the beginning of the spell.	Constructed using data from Central Statistical Office, Trinidad and Tobago.
MultiSpell	Dummy variable equal to 1 if the country-product pair has a spell number greater than 1.	Constructed using data from Central Statistical Office, Trinidad and Tobago.
Log Number .of Export Products	Log of the number of products which Trinidad and Tobago exports to the same country in every spell	Constructed using data from Central Statistical Office, Trinidad and Tobago.
Number of Export Markets	Number of markets to which Trinidad and Tobago exports a given product for every spell	Constructed using data from Central Statistical Office, Trinidad and Tobago.
LnDistance	Is the natural log of the bilateral distance of the export destination from Trinidad and Tobago	CEPII (*Centre d'Estudes Prospectives et d'Informations*) website
Common Language	Dummy variable equal to 1 if export destination has similar language to Trinidad and Tobago	CEPII (*Centre d'Estudes Prospectives et d'Informations*) website
Island	Dummy variable equal to 1 if export destination is an island	CIA World Factbook
Landlocked	Dummy variable equal to 1 if export destination is landlocked.	CEPII (*Centre d'Estudes Prospectives et d'Informations*) website
Common Colony	Dummy variable equal to 1 if export destination and Trinidad and Tobago share colonial heritage.	CEPII (*Centre d'Estudes Prospectives et d'Informations*) website

Notes: CARICOM is defined to also include Venezuela, Columbia, Dominican Republic, Cuba and Costa Rica. Trinidad and Tobago by virtue of being a member of CARICOM enjoys reciprocal access to these markets as a result of bilateral arrangements these countries have signed with CARICOM.

Table A4-5: List of Trinidad and Tobago's Export Destinations in Sample.

AFGHANISTAN	CANADA	GRENADA	MALTA	SINGAPORE
ALBANIA	CAYMAN ISLANDS	GUADELOUPE	MARTINIQUE	SLOVAKIA
ALGERIA	CENTR. AFRICAN REP.	GUAM	MAURITANIA	SOLOMON ISLANDS
AMERICAN SAMOA	CHILE	GUATEMALA	MAURITIUS	SOUTH AFRICA
ANGOLA	CHINA	GUINEA	MEXICO	SPAIN
ANGUILLA	COLOMBIA	GUYANA	MONGOLIA	SRI LANKA
ANTIGUA AND BARBUDA	COMOROS	HAITI	MONTSERRAT	ST. KITTS AND NEVIS
ARGENTINA	CONGO	HONDURAS	MOROCCO	ST. LUCIA
ARMENIA	COSTA RICA	HONG KONG	MYANMAR	ST. PIERRE AND MIQUELON
ARUBA	COTE D'IVOIRE	ICELAND	NAMIBIA	ST. VINCENT
AUSTRALIA	CROATIA	INDIA	NETHERLANDS	SURINAME
AUSTRIA	CUBA	INDONESIA	NETHERLANDS ANTILLES	SVALBARD ISLANDS
AZERBAIJAN	CURACAO	IRAN	NEW ZEALAND	SWAZILAND
BAHAMAS	CYPRUS	IRELAND	NICARAGUA	SWEDEN
BAHRAIN	CZECHOSLOVAKIA	ISRAEL	NIGERIA	SWITZERLAND
BANGLADESH	DENMARK	ITALY	NORWAY	SYRIA
BARBADOS	DOMINICA	JAMAICA	OMAN	TAIWAN
BELARUS	DOMINICAN REP.	JAPAN	OTHER COUNTRIES	THAILAND
BELGIUM	ECUADOR	JORDAN	PAKISTAN	TOGO
BELIZE	EGYPT	KAZAKHSTAN	PANAMA	TUNISIA
BENIN	EL SALVADOR	KENYA	PARAGUAY	TURKEY
BERMUDA	EQUATORIAL GUINEA	KOREA, D. P. REP.	PERU	TURKMENISTAN
BOLIVIA	FAEROE ISLANDS	KOREA, REPUBLIC OF	PHILIPPINES	TURKS AND CAICOS ISL.
BOSNIA HERZEGOVINA	FINLAND	KUWAIT	POLAND	U. S. A.
BOTSWANA	FRANCE	LATVIA	PORTUGAL	U. S. VIRGIN ISLANDS
BOUVET ISLAND	FRENCH GUIANA	LEBANON	PUERTO RICO	UKRAINE
BRAZIL	FRENCH SOUTHERN TERRITORIES	LESOTHO	QATAR	UNITED ARAB EMIRATES
BRITISH IND. OC. TERR.	GABON	LIB ARAB JAMAHIRI	ROMANIA	UNITED KINGDOM
BRITISH VIRGIN ISLANDS	GAMBIA	LIBERIA	RUSSIAN FEDERATION	UNITED REP. OF TANZANIA
BRUNEI DARUSSALAM	GEORGIA	LUXEMBOURG	SAN MARINO	URUGUAY
BULGARIA	GERMANY	MACAU	SAO TOME AND PRINCIPE	US MINOR OUTLYING ISLANDS
BURUNDI	GHANA	MADAGASCAR	SAUDI ARABIA	VENEZUELA
CAMBODIA	GIBRALTAR	MALAYSIA	SENEGAL	VIET NAM
CAMEROON	GREECE	MALDIVES	SIERRA LEONE	YEMEN

Table A4-6: Correlation Matrix of Explanatory Variables (Benchmark Sample).

Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*
(1) LnGDP	1														
(2) LnDistance	0.804	1													
(3) Common Language	-0.357	-0.428	1												
(4) Landlocked	0.080	0.161	-0.185	1											
(5) Island	-0.562	-0.543	0.509	-0.131	1										
(6) Common Colony	-0.813	-0.703	0.702	-0.140	0.639	1									
(7) Ln initial export value	0.045	0.060	-0.079	-0.012	-0.060	-0.049	1								
(8) MultiSpell	-0.145	-0.243	0.230	-0.075	0.140	0.182	-0.031	1							
(9) CARICOM	-0.900	-0.797	0.523	-0.152	0.560	0.854	-0.031	0.221	1						
(10) AvgTariff	-0.366	-0.304	0.009	-0.078	0.128	0.260	0.009	0.024	0.348	1					
(11) WTO	-0.037	-0.068	0.063	-0.009	0.039	0.045	0.002	0.037	0.048	0.002	1				
(12) Governance	0.311	0.200	0.295	0.071	0.150	-0.110	-0.045	0.071	-0.199	-0.294	0.049	1			
(13) Log Promotions (-1)	0.368	0.426	-0.119	0.161	-0.055	-0.245	0.059	-0.093	-0.287	-0.272	0.014	0.033	1		
(14) Number of export market	0.063	0.150	-0.141	0.035	-0.080	-0.096	0.169	-0.070	-0.108	0.064	-0.009	-0.037	0.047	1	
(15) Log number of export products	-0.460	-0.708	0.649	-0.203	0.397	0.547	-0.081	0.277	0.650	0.131	0.085	0.089	-0.279	-0.139	1

Note: Numbers for the columns correspond with the row numbers. The matrix is presented this way merely to conserve space.

Table A4-7: Stratified Cox Estimation Results, Various Samples (using one period lag *Log Promotions*).

VARIABLES	(1) Single Spells Only	(2) First Spell Only	(3) *Initial export value* greater than $10,000TT	(4) Gap adjusted Spells
LnGDP	-0.0337	0.0277	-0.219**	0.384***
	(0.0791)	(0.0629)	(0.103)	(0.0641)
Ln initial export value	-0.0499***	-0.0494***	-0.0899***	-0.0455***
	(0.00322)	(0.00265)	(0.00862)	(0.00274)
MultiSpell			0.188***	-0.193***
			(0.0244)	(0.0149)
CARICOM	-0.734**	-0.208	-1.439***	-0.0283
	(0.304)	(0.268)	(0.327)	(0.321)
AvgTariff	-0.0144***	-0.00927***	-0.00848***	-0.0136***
	(0.00247)	(0.00140)	(0.00208)	(0.00170)
WTO	-1.111***	-0.997***	-1.182***	-1.133***
	(0.246)	(0.194)	(0.289)	(0.245)
Governance	0.137**	0.0586	0.0136	0.103**
	(0.0564)	(0.0423)	(0.0706)	(0.0412)
Log Promotions (-1)	-0.429***	-0.423***	-0.377***	-0.477***
	(0.0837)	(0.0749)	(0.112)	(0.0744)
Number of export markets	-0.0696***	-0.0578***	-0.0725***	-0.0666***
	(0.00290)	(0.00224)	(0.00348)	(0.00244)
Log number of export products	-0.0965***	-0.0716***	0.0164	-0.0841***
	(0.0194)	(0.0156)	(0.0285)	(0.0157)
Country Fixed Effects	Yes	Yes	Yes	Yes
Stratification Variables	Region, 2-digit industries	Region, 2-digit industries	Region, 2-digit industries	Region, 2-digit industries
Observations	7,880	12,943	7,186	18,902

Notes: The dependent variable is the hazard rate. A positive sign on the coefficient signifies an increase in the probability of an export relationship failure (increase in the hazard rate) and vice-versa. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. *MultiSpell* is omitted in column (1) and (2) because it is meaningless for these subsamples.

Table A4-8: Stratified Cox Estimation Results, Various Samples (using four period lag *Log Promotions)*.

VARIABLES	(1) Single Spells Only	(2) First Spell Only	(3) *Initial export value* greater than $10,000 TT	(4) Gap adjusted Spells
LnGDP	-0.565***	-0.488***	-0.588***	0.0481
	(0.0845)	(0.0732)	(0.118)	(0.0742)
Ln initial export value	-0.0329***	-0.0310***	-0.0708***	-0.0358***
	(0.00334)	(0.00294)	(0.00930)	(0.00305)
MultiSpell			-0.0738***	-0.239***
			(0.0257)	(0.0152)
CARICOM	-3.789***	0.412	-4.458***	-0.358**
	(0.458)	(0.714)	(0.585)	(0.183)
AvgTariff	-0.00290*	-0.00339***	-0.00441**	-0.00536***
	(0.00175)	(0.00128)	(0.00202)	(0.00153)
WTO	-0.785***	-0.752***	-0.993***	-0.999***
	(0.284)	(0.215)	(0.282)	(0.264)
Governance	0.222***	0.152***	0.0107	0.139***
	(0.0670)	(0.0537)	(0.0890)	(0.0529)
Log Promotions (-4)	-0.910***	-0.838***	-0.930***	-0.942***
	(0.171)	(0.153)	(0.206)	(0.128)
Number of export markets	-0.0402***	-0.0370***	-0.0626***	-0.0539***
	(0.00319)	(0.00276)	(0.00462)	(0.00330)
Log number of export products	-0.0670***	-0.0662***	0.0433	-0.0355*
	(0.0204)	(0.0187)	(0.0348)	(0.0193)
Country Fixed Effects	Yes	Yes	Yes	Yes
Stratification Variables	Region, 2-digit industries	Region, 2-digit industries	Region, 2-digit industries	Region, 2-digit industries
Observations	6,086	8,286	5,476	14,077

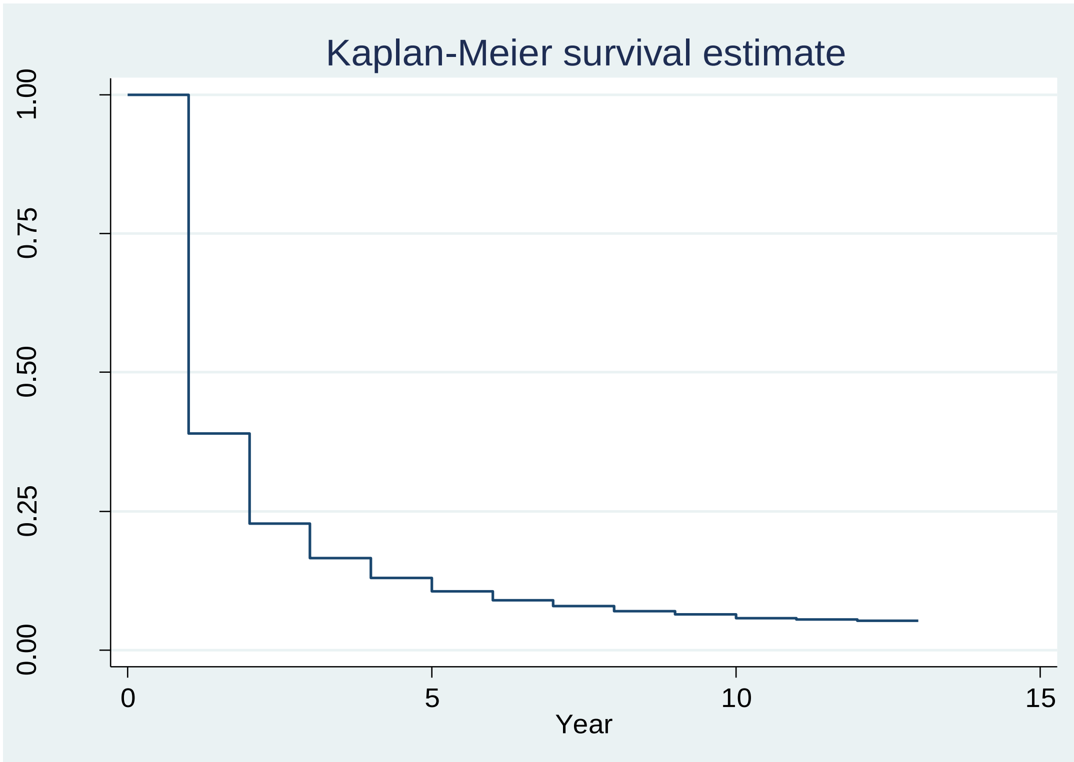
Notes: The dependent variable is the hazard rate. A positive sign on the coefficient signifies an increase in the probability of an export relationship failure (increase in the hazard rate) and vice-versa. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. *MultiSpell* is omitted in column (1) and (2) because it is meaningless for these subsamples.

Table A4-9: Results of Exponential Estimations (various specifications).

	(1)	(2)	(3)	(4)
VARIABLES	Hazard Rate	Hazard Rate	Hazard Rate	Hazard Rate
LnGDP	-0.0224***	-0.0281***	0.292***	-0.0558
	(0.00664)	(0.00649)	(0.0671)	(0.0762)
LnDistance	0.163***	0.175***		
	(0.0130)	(0.0127)		
Common Language	-0.202***	-0.211***		
	(0.0228)	(0.0223)		
Landlocked	-0.0280	-0.0536		
	(0.0418)	(0.0435)		
Island	-0.0218	-0.0203		
	(0.0194)	(0.0189)		
Log initial export value	-0.0645***	-0.0700***	-0.0685***	-0.0568***
	(0.00301)	(0.00306)	(0.00304)	(0.00320)
MultiSpell	0.0774***	0.112***	0.113***	-0.136***
	(0.0167)	(0.0165)	(0.0164)	(0.0170)
CARICOM	-0.0328	-0.0728*	0.127	-0.797***
	(0.0429)	(0.0420)	(0.231)	(0.250)
AvgTariff	-0.00951***	-0.00856***	-0.0114***	-0.00536***
	(0.00124)	(0.00120)	(0.00162)	(0.00179)
WTO	-0.0759	-0.129**	-1.055***	-0.864***
	(0.0491)	(0.0548)	(0.211)	(0.259)
Governance	-0.0363***	-0.0384***	0.0309	0.106*
	(0.0115)	(0.0113)	(0.0460)	(0.0549)
Log Promotions(-1)	-0.0337	-0.0181	-0.507***	
	(0.0303)	(0.0299)	(0.0834)	
Log Promotions(-4)				-1.175***
				(0.132)
Number of export markets	-0.0767***	-0.0719***	-0.0732***	-0.0568***
	(0.00230)	(0.00231)	(0.00231)	(0.00292)
Log number of export products	-0.0674***	-0.0711***	-0.0251	0.00144
	(0.0125)	(0.0125)	(0.0202)	(0.0228)
2-digit industry dummy	Yes	Yes	Yes	Yes
Country Fixed Effects	No	No	Yes	Yes
Observations	24,519	24,519	24,519	18,952

Notes: The dependent variable is the hazard rate. A positive sign on the coefficient signifies an increase in the probability of an export relationship failure (increase in the hazard rate) and vice-versa. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Estimations are based on the full sample

Figure A4-1: Kaplan-Meier Survival Estimates, Benchmark Case Excluding Left censored Observations.



Chapter 5
Conclusion

5.1 Overview and Summary of Key Findings

We acknowledge that the composition and behaviour of exports matter for development. Notwithstanding the tremendous recent growth in econometric studies looking at these issues in the context of developed countries and the larger emerging economies, there exists a dearth of literature examining these issues in the context of smaller developing countries. In this regard, we seek to examine the composition and behaviour of exports and to identify the various factors influencing them from the perspective of a small developing country, Trinidad and Tobago, for the period 1996-2009. More specifically, we seek to measure and examine the factors influencing the extent of export specialization, the contribution of the intensive and extensive margin to export growth and the duration of export relationships. Knowledge of these issues is particularly important for trade policy formulation and export promotion in developing countries.

Using export data, at different levels of aggregation and various estimation strategies, our study unearth several key findings. Our results show that Trinidad and Tobago's exports are highly specialized, the extensive margin contributes substantially to export growth (for manufactured goods) and the duration of export relationships is extremely short. These results seem consistent with each other. For example, the short export duration suggests that there are lots of extry of products to foreign markets and exit of products from foreign markets; it is therefore not surprising that the extensive margin is substantial for manufactured goods. Also, consistent with the aforementioned results, we find that Trinidad and Tobago's export duration is longer if it is exporting many products to the same market and/or exporting the same product to many markets (more diversified or less specialized its exports). It is therefore not surprising that Trinidad and Tobago's export duration is short given that its exports to partner countries are highly specialized. In addition, we find strong evidence that Trinidad and Tobago's exports to larger markets (larger GDP or Population size) are less specialized, increase both the intensive and the extensive margins of export growth but with a stronger effect on the intensive margin and increase export duration. These results corroborate each other. Given that exports are more diversified to larger markets, it is not surprising that the extensive margin is enhanced and export duration is longer. Relatedly, we find substantial evidence that Trinidad and Tobago' exports to countries with higher levels of economic development (larger GDP per Capita) are less specialized and the duration of exports is longer. Clearly, our results with respect to the level of economic development of export destinations seem consistent with our general results with respect to country size. Turning our attention to our geographic characteristics and other standard gravity variables, we find strong evidence that greater distance from export markets increases export specialization, dampens both the intensive and extensive margins but with a stronger dampening effect on the extensive margin and reduces export duration. Our results with respect to distance seem consistent and are generally in line with our theoretical priors given that distance increases trade costs. Further, our results show strong evidence that the extensive margin is higher in export markets where English is the main official language and the duration of exports are longer. We also find substantial evidence that exports to landlocked countries have higher intensive margin and the duration of exports to these countries is longer. In addition, we find that exports to countries which are islands enhance both margins but the duration of relationships is shorter.

Focusing on our trade policy and institutional quality variables, we unearth cogent evidence that regional integration with trade partners through CARICOM membership reduces export specialization, increases both the intensive and extensive margins but with a stronger effect on the extensive margin and increases export duration. These results seems consistent with each other as we expect the availability of preferences to reduce trade costs in the associated export markets thereby making it possibly for profitable exports of a larger number of products (extensive margin), reducing export specialization and increasing the survival rate of trade relationships. Relatedly, with regard to non-reciprocal preferences, we discover some evidence that non-reciprocal preferences increase export specialization, increase the extensive margin but reduce the intensive margin. With regard to tariffs, we find some evidence that higher tariffs in export destinations increases export specialization, reduce the extensive margin and increase export duration. What the latter findings suggest is that entry is reduced with higher tariffs but the products that actually enter markets remain traded for a longer time. Again, these results are not inconsistent with each other. Further, we find evidence that WTO membership of trade partners increases the intensive margin and increases export duration. Regarding governance, we find substantial evidence that better institutional quality and governance in export destinations reduces export specialization, dampens the intensive margin but surprisingly reduces export duration. Finally, we find some evidence that the presence of Diplomatic Missions and Consulates in export markets increases the intensive margin and dampens the extensive margin. Relatedly, we find robust evidence that Trinidad and Tobago's export duration is longer, the higher the spending per capita on Diplomatic Missions and Consulates (per capita expenditure on trade promotions) in the export markets. The results on trade promotions therefore seem consistent with each other, and suggest that economic diplomacy has a greater impact on already traded products rather than new products.

5.2 Main Policy Implications

The findings of our research should be of interest beyond academia and certainly convey some important messages for policy makers. The high degree of export specialization suggests that policy makers in Trinidad and Tobago need to redouble their efforts to achieve the much talked about and long standing economic development objective of export diversification. The tremendous vulnerability of the Trinidad and Tobago economy to the vagaries of the international economic environment seems quite evident. In order to achieve sustainable export growth and diversification, policy makers in Trinidad and Tobago certainly needs to address the issue of short export duration. Export growth and diversification will certainly be constrained if new products stop being exported after only a few years. Policy makers need to be cognisant of the fact that exports could grow by having fewer failures of export relationships (sustainability margin). Therefore, the export promotion strategy must not only focus on expanding the intensive and extensive margins but on enhancing export survival. Moreover, the results of our research suggest that the composition of Trinidad and Tobago's exports are influenced significantly by the prevailing economic conditions (as indicated by GDP and GDP per capita) in export markets. This again highlights the tremendous vulnerability of Trinidad and Tobago economy to the vagaries of the international economic environment (e.g financial crises) and also points to the need for greater diversification of the country's export base. Indeed, recent events in the market for Liquefied Natural Gas (LNG) highlight the high degree of specialization of Trinidad and Tobago's exports and the associated vulnerability to international events. The United States had been the largest destination of LNG exports from Trinidad and Tobago since the start of LNG production in 1999. For instance, in 2004, Trinidad and Tobago exported 99% of the product to the United States. However, the advent of shale gas production in the United States sharply lowered its demand for LNG, while demand from Latin America, Europe, and Asia has increased. As a result of the changing demand situation, gas prices in Europe, Latin America, and Asia have been higher than in the United States (International Monetary Fund, 2012a). What this means, is that, diversification away from the United States market will increase export revenues due to higher export prices.

Further, our results suggest that regional integration through CARICOM seems to be contributing significantly to reducing export specialization (export diversification), increasing the intensive and the extensive margins of export and increasing export duration. In view of this, continued efforts should be made to strengthen and deepen the CARICOM integration movement. In this regard, more aggressive steps should be taken to ensure more effective implementation of the proposals for the establishment of the CARICOM Single Market and Economy (CSME). The effective implementation of these proposals will ensure the further removal of barriers to trade thereby allowing freer movements of goods, services, capital and people among member states and is therefore likely to enhance trade and generate favourable changes in the composition of exports. Also, greater considerations could be given to expand the CARICOM market possibly through the establishment of CARICOM-Bilateral Trade Agreements with other neighbouring countries such as Guatemala, Honduras and Panama; all countries with relatively large populations. This will allow Trinidad and Tobago along with other CARICOM member states to derive benefits from economies of scale emanating from an enlarged CARICOM market. By contrast, the effectiveness of non-reciprocal preferences in creating favourable changes to the composition and behaviour of exports has been limited. Indeed, we found some evidence that these preferences may be contributing to export specialization rather than diversification. Rather than reflecting the effect of preferences, this may be a reflection of a greater degree of competition in the export markets in the countries offering these types of preferences. This situation may be exacerbated by the fact that Trinidad and Tobago firms produce on a relatively smaller scale, and thus, are unable to fully exploit the cost benefits that arise from economies of scale. It may also suggest that there are other barriers to trade operating in these developed country markets, or Trinidad and Tobago manufacturers are unaware of and thus unable to exploit available preferences. Whatever the reason for these findings, Trinidad and Tobago needs to collaborate with its CARICOM trading partners and other small island states to lobby the industrialized countries in North America and Europe for more beneficial export relationships. For example, representation could be made to expand the list of products covered under these preference schemes because at present not all goods are covered under these schemes. We suggest a collaborative approach in view of the fact that Trinidad and Tobago is a small player in international trade, and cannot by itself influence trade policy in developed countries. There may also be a need to evaluate and where necessary strengthen the capacity of countries in the region (Caricom partners) to engage in trade negotiations. It may also be necessary to provide incentives to Trinidad and Tobago manufacturers and prospective manufacturers to encourage innovation and product discovery. Finally, greater efforts may be required to retool the Trinidad and Tobago private sector to take advantage of existing market opportunies and to target new markets.

Our results also suggest that WTO membership of trading partners is having a greater impact and is more effective in expanding trade in existing products (intensive margin) rather than new products (extensive margin). In this regard, there may be a need for institutional strengthening at a regional level to build capacity and train personnel with the technical expertise to understand, interpret and act on some the various aspects of WTO agreements. Moreover, our results suggest that institutional quality and governance in export markets is indeed an important influence on the composition and behaviour of Trinidad and Tobago's exports. While recognizing that some of the institutional obstacles to trade in export markets are outside the direct control of policy makers in Trinidad and Tobago, greater effort may be required to gain a better understanding of some of the institutional obstacles to trade in export markets so that some of these obstacles could be addressed via specific trade missions and other trade promotion initiatives. This will certainly require more effective monitoring of the World Bank Doing Business Report to get a better understanding of some of the institutional barriers to exports in specific export markets.

Our results also suggest that expenditure on trade promotions via Embassies and Consulates are likely to significantly enhance export survival in international markets; and that, economic diplomacy is likely to be more effective in expanding the intensive margin than the extensive margin. One reason for this is that Embassies and Consulates may not have the specialist personnel to give effective assistance to exporters of new products (extensive margin) in comparison to the assistance they can give to existing exporters (intensive margin). Therefore, some consideration could be given to equipping Embassies and Consulates with appropriate personnel better positioned to alleviate the specific information problems impeding the export of new products. There also may be a need for a greater effort to sensitize potential exporters about the availability of the services offered by these Diplomatic Agencies so that greater use can be made of their services in the export process. Beyond the role of Embassies and Consulates in trade promotions, other forms of trade promotions via trade missions and though the establishment of trade promotions agencies in specific markets could prove to be beneficial to trade.

In addition, our results suggest that the extensive margin is higher and export duration longer in countries where English is the main official language. This suggests that addressing language barriers could act to reduce transactions costs and enhance trade. Implicit in this finding is that, if policy makers in Trinidad and Tobago want to achieve their stated objective to expand trade in the large (and nearby) South and Central American market (where Spanish is the official language), a programme to boost the ability of Trinidad and Tobago's citizens to communicate in Spanish could prove to be beneficial.

Finally, our results suggest that natural characteristics of export destinations (such as their distance, whether they are islands or not, and whether they are landlocked or not) influence the composition and behavior of Trinidad and Tobago's exports. This means that some of the factors fashioning export composition and behavior are outside the direct control of policy makers in Trinidad and Tobago, and this increases the challenge in generating favourable changes in export composition and behavior.

5.3 Directions for Future Research

The results we obtain from our research provide useful insights into the composition and behaviour of exports and the factors influencing them in a developing country context. However, we acknowledge some limitations that suggest the need for future research on several aspects of our work. In this context, our study focuses on Trinidad and Tobago, whether the factors explaining the composition and behaviour of trade in other Caribbean states are similar remains and interesting yet unanswered question. This question is even more relevant in view of the fact that, although other Caribbean countries are also highly exports dependent (and monocultural), there exists some heterogeneity with regard to their main export products (or service). For example Barbados is dependent on tourism services, Jamaica relies heavily on bauxite and alumina and many of the other smaller Caribbean countries depend on the export of a single agricultural commodity (e.g nutmeg in the case of Grenada and Banana in the case of St. Vincent and St. Lucia). Therefore, a natural next step would be an extension of our research to see if our results hold for other countries in the Caribbean region. Another limitation of our work is that we focus exclusively on trade in goods and ignore trade in services. Notably, trade in services is becoming an important source of diversification and ignoring the effects of services could have introduced bias in our results. During the period of our study, the value for service exports (BoP, current US$) of Trinidad and Tobago rose by approximately 66% from $461,243,900 in 1996 to $764,800,000 in 2009 (International Monetary Fund, 2012b). We would have liked to incorporate services trade in our analysis but data on services trade, particularly for developing countries is notoriously difficult to procure, especially with product and market disaggregation. Our work could be enhanced in the future by incorporating data on services trade in our analysis. Further, throughout the thesis we captured the effect of trade policy in export markets mainly though the effect of tariffs and preferences. By doing so, we ignored the role of non-tariff barriers which we presume could be an important influence the composition and behaviour of trade. Thus, ignoring the impact of non-tariff barriers could possibly introduce bias in some of our estimation results. What is somewhat comforting is the fact that in some of our econometric specifications, we include country fixed effects and we hope that the effects of non-tariff barriers are captured though these fixed effects. However, the policy relevant question of the role of non-tariff barriers in explaining the composition and behaviour of trade remains unanswered. We acknowledge that the procuring reliable data non-tariff barriers could pose a significant challenge. Notwithstanding this, our work could be enhanced with the inclusion of data to give greater consideration of the role of non-tariff barriers. This is even more important given that the use of non-tariff barriers to trade has become increasingly common. In addition, to capture the effect of regional integration, we used a dummy variable that takes the value of one if the export destination is a member of CARICOM in the specific year and zero otherwise. The use of this dummy variable does not adequately capture changes in the degree of integration that may have taken place in the period of our analysis. During the period of our study, some CARICOM countries took significant steps towards the establishment of the CARICOM Single Market and Economy (CSME). Our work could be extended and enhanced by using some proxy to better capture changes in the degree of integration. Also, to capture institutional quality and governance in export destinations, we use a composite index comprising the mean of the six (6) Worldwide Governance Indicators of the World Bank. To better inform policy, a more detailed analysis of the impact of institutional quality and governance on the composition and behaviour of exports may be required. An interesting policy relevant research issue for future study is the comparative impacts of the individual indicators of institutional quality and governance on the composition and behaviour of exports. This information would allow for more targeted policy responses to address some of the institutional barriers to trade.

Beyond the general limitations (which are relevant to all chapters) outlined in the foregoing paragraph, there are also some chapter specific issues to be addressed. For example, in Chapter 2 we use the Herfindahl index as the main measure of export specialization. We know that the Herfindahl index is only defined with respect to bilateral trade partners with which Trinidad and Tobago had positive trade values in the period. Thus, the exclusion of zeros from our estimation may introduce possible bias in our coefficient estimates. In our future work, we may want to consider the sensitivity of our results to the exclusion of zero values. Also in this Chapter, we propose to expand the list of explanatory variables by including some other policy relevant variables such as trade promotion expenditure in export destination, WTO membership of trade partners and language. This will certainly enhance and broaden the relevance of this research for trade policy formulation.

Also, in Chapter 3 to decompose the export growth into the intensive and extensive margins, we use information on the value of exports rather than the disaggregated price and quantity information (which was not available). By doing so, we are unable to ascertain how much of the changes in each margin are driven by price changes and how much are driven by quantity changes. This information is important as changes in the margins that are driven by quantity changes could have greater implications for development. Given that for a major significant period in our study, huge increases in the prices of hydrocarbon products occurred, information on whether changes in the trade margins are driven by quantity changes or price changes are even more vital and could form the focus of a future enquiry subject to the availability of price and quantity information rather than values. Further, we capture the effect of trade promotion in export markets by the use of a dummy variable capturing the presence or absence of

Diplomatic Missions or Consulates. However, trade promotions in export markets are sometimes done via Trade Missions that are conducted by various government ministries and this is not captured by our measure. Ignoring the effect of trade promotions by other agencies could result in biased estimates. Also, by using a dummy variable to capture the effect of Diplomatic Missions, our measure of trade promotion cannot capture changes in the extent of promotion. In an attempt to minimize some of these concerns, in our future work, we propose to capture the effect of trade promotion using the per capita expenditure on trade promotions of all agencies (rather than only the Diplomatic agencies). Using this continuous variable will offer us additional flexibility to address potential endogeniety concerns with our trade promotion variable. In addition, our definition of extensive margin in our estimations incorporates both new and existing products. As part of our future research agenda, we may want to separate the two enabling us to study what determines the number of new products specifically. This information could prove even more vital for trade policy formulation.

Finally, in Chapter 4, we use the continuous time model (Stratified Cox Model) to perform our estimations and these models are unable to accommodate variations within spells of our time varying covariates. This is because the data is organized one spell per row. Moreover, despite the popularity of the Cox estimation framework, there has been some recent criticism level against this procedure for analysing trade duration by Hess and Persson (2012). These criticisms relate to the following: (1) The inability of the Cox model to deal with tied duration times; (2) The ineffectiveness of the Cox model to adequately deal with issues of unobserved heterogeneity; and (3) The restrictive assumption of proportional hazards the Cox model imposes. They propose that estimation be done using discrete models (for example probit, logit or cloglog). In our future works, to better accommodate time varying covariates and to deal with the recent criticism levelled against continuous models by Hess and Persson (2012), we propose to estimate using discrete models. Using these types of models give us additional options to deal with endogeniety concerns with respect to our trade promotion variable by using some suitable instrument and estimation technique.

References

Acemoglu, Daron and Fabrizio Zilibotti (1997), "Was Prometheus unbound by chance? Risk, diversification and growth," *Journal of Political Economy,* Vol. 105(4), pp. 709-751.

Acemoglu, Daron and Ventura Jaume (2002), "The world income distribution," *Quarterly Journal of Economics,* Vol. 117 (2), pp. 659-94.

Aeberhardt, Romain, Ines Buono and Harald Fadinger (2012), "Learning, incomplete contracts and export dynamics: Theory and evidence from French firms," Mimeo.

Agosin, Manuel and Claudio Bravo-Ortega (2009), "The emergence of new successful export activities in Latin America: The case of Chile," Research Network Working Paper No. R-552, Inter-American Development Bank.

Agosin, Manuel R., Roberto Alvarez, and Claudio Bravo-Ortega (2009), "Determinants of export diversification around the world: 1962-2000," FONDECYT Grant 1085014, STD 309.

Araujo, Luis and Emmanuel Ornelas (2007), "Trust-based trade," CEP Discussion Paper No. 820, Centre for Economic Performance, London School of Economics, London.

Araujo, Luis, Giordano Mion and Emanuel Ornelas (2012), "Institutions and export dynamics," Mimeo.

Arezki, Raban and Fredrick Van der Ploeg (2007) "Can the natural resource curse be turned into a blessing? The role of trade policies and institutions," IMF Working Paper No.WP/07/55.

Arkolakisz, Costas and Marc-Andreas Muendler (2009), "The extensive margin of exporting goods: A firm-level analysis," Mimeo.

Armington, Paul S. (1969), "A theory of demand for products distinguished by place of production," *International Monetary Fund Staff Papers*, Vol. 16(1), pp.159-78.

Ali, Ridwan, Jeffery Alwang and Paul Siegel (1991) "Is export diversification the best way to achieve export growth and stability? A look at three African Countries," World Bank Working Paper No.727.

Amador, Joao and Luca D. Opromolla (2013), "Product and destination mix in export markets," *Review of World Economics*, Vol. 149, pp. 23-53.

Amurgo-Pacheco, Alberto (2006), "Preferential trade liberalization and the range of exported products: The case of the Euro-Mediterranean FTA," HEI Working Paper No: 18, Graduate Institute of International Studies, Geneva.

Amurgo-Pacheco, Alberto and Martha D. Pierola (2007), "Patterns of export diversification in developing countries: intensive and extensive margins," HEI Working Paper No. 20, Graduate Institute of International Studies, Geneva.

Amity, Mary and Caroline Freund (2007), "An anatomy of China's trade growth," Mimeo.

Andersson, Martin (2007), "Entry costs and adjustments on the extensive margin-an analysis of how familiarity breeds exports," CESIS Working Paper No. 81, Royal Institute of Technology, Stockholm.

Ando, Mitsuyo and Fulunari Kimura (2012), "How did the Japanese exports respond to the two crises in international production network?: The global financial crisis and the East Japan earthquake," ERIA Discussion Paper Series, ERIA-DP-2012-10.

Baier, Scott and Jeffrey H. Bergstrand (2007), "Do free trade agreements actually increase member's international trade?" *Journal of International Economics,* Vol. 71, pp.72-95.

Baier, Scott, Jeffrey H. Bergstrand and Michael Feng (2011), "Economic integration agreements and the margins of international trade: A "distorted gravity" approach," Mimeo.

Baldwin, Richard (1988), "Hysteresis in import prices: The beachhead effect," *The American Economic Review,* Vol. 78(4), pp.773-785.

Baldwin, Richard (1990), "Hysteresis in trade," *Empirical Economics,* Vol. 15(2), pp. 127-142.

Baldwin, Richard and Paul Krugman (1989), "Persistent trade effects of large exchange rate shocks," *Quarterly Journal of Economics*, Vol. 104, pp. 635-654.

Baldwin, Richard (2005), "Heterogeneous firms and trade: Testable and untestable properties of the Melitz model," NBER Working Paper No. 11471.

Ballinger, Gary (2004), “Using generalized estimating equations for longitudinal data analysis,” *Organizational Research Methods*, Vol 7(2) pp.127-150.

Bastos, Paulo and Joana Silva (2008), “Cultural links, firm heterogeniety and the intensive and extensive margins of international trade,” Research Paper No. 2008/30, GEP University of Nottingham.

Bebczuk, Ricardo and Daniel N. Berrettoni (2006), “Explaining export diversification: an empirical analysis,” CAF Research Program on Development Issues, Paper present at Seminar in 2005 LACEA Meeting.

Bernasconi, Claudia (2009), “New evidence for the Linder hypothesis and the two extensive margins of trade,” Working Paper, Institute for Empirical Research in Economics, University of Zurich.

Berthelon, Matias (2011), “Chilean export performance: The role of intensive and extensive margins,” Central Bank of Chile Working Papers No. 615.

Bernard, Andrew and Bradford Jensen (2004), “Entry, expansion, and intensity in the US export boom, 1987-1992,” *Review of International Economics,* Vol. 12(4), pp. 662-675.

Bernard, Andrew, Bradford Jensen, Stephen J. Redding and Peter K. Schott (2007), “Firms in international trade,” *Journal of Economic Perspectives,* Vol. 21(3), pp.105-130.

Bernard, Andrew, Bradford Jensen, Stephen J. Redding and Peter K. Schott (2009), "The margins of US trade," *American Economic Review: Papers & Proceedings*, Vol. 99(2), pp. 487-493.

Berthelon, Matias (2011), "Chilean export performance: The role of intensive and extensive margins," Central Bank of Chile Working Papers No. 615.

Bensassi, Sami, Laura Márquez-Ramos and Inmaculada Martínez-Zarzoso (2010), "Economic Integration and the two margins of trade: An application to the Euro-Mediterranean agreements," CREMed Working Paper Series, Working Paper No. 2.

Besedeš, Tibor (2008), "A search cost perspective on formation and duration of trade," *Review of International Economics*, Vol. 16 (5), pp. 835-849.

Besedeš, Tibor (2012), "The role of NAFTA and returns to scale in export duration," Mimeo, Georgia Institute of Technology.

Besedeš, Tibor and Juan Blyde (2010), "What drives export survival? An analysis of export duration in Latin America," Mimeo, Inter-American Development Bank.

Besedeš, Tibor and Thomas J. Prusa (2006a), "Ins, outs and the duration of trade," *Canadian Journal of Economics*, Vol. 39(1), pp. 266-295.

Besedeš, Tibor and Thomas J. Prusa (2006b), "Product differentiation and duration of US import trade," *Journal of International Economics*, Vol. 70(2), pp. 339-358.

Besedeš, Tibor and Thomas J. Prusa (2010), "The duration of trade relationships," Mimeo.

Besedeš, Tibor and Thomas J. Prusa (2011), "The role of the extensive and intensive margin in export growth," *Journal of Development Economics*, Vol. 96(2), pp. 371-379.

Bingzhan, Shi (2011), "Extensive margin, quantity and price in China's export growth," *China Economic Review*, Vol. 22, pp. 233-243.

Box-Steffensmeier, Janet and Zorn Christopher (1998), "Duration models and proportional hazards in political science," *American Journal of Political Science*, Vol. 45(4), pp. 972-988.

Brada, Josef and Jose A. Mendez (1983), "Regional economic integration and the volume of intra-regional trade: a comparison of developed and developing country experience," *Kyklos*, Vol. 36, pp. 589-603.

Brenton, Paul and Richard Newfarmer (2007), "Watching more than the discovery channel: Export cycles and diversification in development," World Bank Policy Research Working Paper No.4302.

Brenton, Paul, Christian Saborowski and Erik V. Uexkull (2009), "What explains the low survival rate of developing country export flow?" World Bank Policy Research Working Paper No. 4951.

Bricongne, Jean-Charles, Lionel Fontagne, Guillaume Gaulier, Daria Taglioni and Vincent Vicard (2011), "Firms and the global crisis: French exports in the turmoil," *Journal of International Economics*, Vol. 87(1), pp.134-146.

Broada, Christian and David E. Weinstein (2004), "Globalization and the gains from variety," NBER, Working Paper No.10314.

Buono, Ines and Guy Lalanne (2010), "The effect of the Uruguay Round on the intensive and extensive margins of trade," *Journal of International Economics*, Vol. 86(2), pp. 269-283.

Cabot, Olivier, Leonardo Iacovone, Denisse Pierola and Ferdinand Rauch (2013), "Success and failure of African exporters," *Journal of Development Economics*, Vol. 101, pp. 284-296.

Caldeira, Manuel and Paula Viera (2010), "Determinant of export diversification and sophistication in Sub-Saharan Africa," Paper presented at NBER Africa Project pre-conference, of February 2009.

Celine, Carrere and Vanessa Strauss-Kahn (2012), "Export dynamics: raising Developing Countries export survival through experience," Mimeo.

Chang, Kelvin (1991), "Export diversification and international debt under terms-of-trade uncertainty," *Journal of Development Economics*, Vol. 36, pp. 259-279.

Chaney, Thomas (2008), "Distorted gravity: The intensive and extensive margins of international trade," *American Economic Review*, Vol. 94(4), pp. 1707-1721.

Chen, Wei-Chih (2011), "Innovation and duration of exports," China Trade Research Group (CTRG) Working Paper Series Working Paper No. 005.

Christodoulopoulou, Styliani (2010), "The effect of multilaterial trade liberalization on the extensive and intensive margins of trade," Munich Personal RePEc Archive (MPRA) Paper No. 29169.

Crabbe, Karen and Michel Beine (2009), "Trade, institutions and export specialization," LICOS Discussion Paper Series No. 234.

Crozet, Matthieu and Pamina Koenig (2010), "Structural gravity equations with intensive and extensive margins," *Canadian Journal of Economics,* Vol. 43(1), pp. 41-62.

Corcoles, David, Carmen Diaz-Mora and Rosario Gandoy (2012), "Export survival in global value chains," Working Papers on International Economics and Finance No.12-03.

Costas, Arkolakis, Svetlana Demidova, Peter J. Klenow and Andres Rodriquez-Clare (2008), "Endogenous variety and the gains from trade," *American Economic Review and the Proceedings,* Vol. 98 (2), pp. 444-450.

Coughlin, Cletus and Howard J. Wall (2011), "Ethnic networks and trade: Intensive versus extensive margins," *Economic Letters,* Vol. 113, pp. 73-75.

Cox, David (1972), "Regression models and life tables," *Journal of Royal Statistical Society (Series B),* Vol. 34 (2), pp. 187-220.

Deadorff, Allan V. (2004), "Local comparative advantage: trade cost and the pattern of trade," RSIE Discussion Paper No. 500.

Debaere, Peter and Shalah Mostashari (2010), "Do tariffs matter for extensive margins of international trade? An empirical analysis," *Journal of International Economics*, Vol. 81, pp. 163-169.

De Benedictis, Luca, Marco Gallegati and Massimo Tamberi (2009), "Overall specialization and development: countries diversify!" *Review of World Economics*, Vol. 145 (1), pp. 37-55.

De Groot, Henri, Gert-Jan Linders, Piet Rietveld and Uma Subramanian (2003), "The institutional determinants of bilateral trade patterns," Tinbergen Institute Discussion Paper No. TI 2003-044/3.

De La Cruz, Justino (2008), "Export diversification and the Caribbean Basin Economic Recovery Act," Paper No.2008-09-E Office of Economics Working Paper U.S International Trade Commission, Washington DC.

De Nardis, Sergio, Carmine Pappalaro and Claudio Vicarelli (2008), "The Euro adoption's impact on extensive and intensive margins of trade: The Italian case," Mimeo, Institute for Social and Economic Analyses (ISAE), Rome.

Dennis, Allen and Ben Shepherd (2007), "Trade costs, barriers to trade, and export diversification in developing countries," World Bank Policy Research Working Paper No. 4368.

Dennis, Allen and Ben Shepherd (2010), "Trade facilitation and export diversification," *The World Economy*, Vol. 34(1), pp. 101-122.

Dornbusch, Rudiger, Stanley Fischer and Paul Samuelson (1977), "Comparative advantage, trade and payments in a Ricardian model with a continuum of goods," *American Economic Review,* Vol. 67, pp. 823-839.

Dutt, Pushan, Ilian Mihov and Timothy V. Zandt (2008), "Trade diversification and economic development," Mimeo.

Dutt, Pushan, LLian Mihov and Timothy V. Zandt (2011), "Does WTO matter for the extensive and the intensive margins of trade?" Mimeo.

Eaton, Jonathan and Samuel S. Kortum (2002), "Technology, geography and trade," *Econometrica,* Vol. 70(5), pp. 1741-1779.

Eaton, Jonathan, Marcela Eslava, Maurice Kugler and James Tybout (2007), "The margins of entry into export markets evidence from Colombia," Mimeo.

Esteve-Perez, Silviano, Francisco Requena-Silvente and Vincente J. Pallardo-Lopez (2013), "The duration of firm-destination export relationships: Evidence from Spain, 1997-2006," *Economic Inquiry,* Vol. 51 (1), pp. 159-180.

Feenstra, Robert (1994), "New product varieties and the measurement of international prices," *The American Economic Review,* Vol. 84 (1), pp. 157-177.

Feenstra, Robert and Hiau L. Kee (2004), "On the measurement of product variety in trade," *The American Economic Review*, Vol. 94 (2), pp. 145-149.

Feenstra, Robert and Hiau L. Kee (2007), "Trade liberalization and export variety: A comparison of Mexico and China," *The World Economy*, Vol. 30 (1), pp. 5-21.

Felbermayr, Gabriel and Wilhelm Kohler (2006), "Exploring the intensive and extensive margins of world trade," *Review of World Economics,* Vol. 142 (4), pp. 642-674.

Felbermayr, Gabriel and Wilhelm Kohler (2007), "Does WTO membership make a difference at the extensive margin of world trade?" CES IFO Working Paper No.1898.

Ferto, Imre and Karoly A. Soos (2008), "Duration of trade of former Communist countries at the EU," Institute of Economics, Hungarian Academy of Sciences Discussion Papers No. 16.

Foster, Neil, Johannes Poschl and Robert Stehrer (2011), "The impact of preferential trade agreements on the margins of international trade," *Economic Systems,* Vol. 35, pp. 84-97.

Fonseca, Ethel M. (2008) *Essays in Empirical International Trade,* Unpublished PhD. Thesis, State University of New Jersey.

Frankel A. Jeffrey and David Romer (1999), "Does trade cause growth?" *American Economic Review*, Vol. 89(3), pp. 379-399.

Fugazza, Marco and Ana C. Molina (2011), "On the determinants of exports survival," United Nations Conference on Trade and Development, Policy Issues in International Trade and Commodities Study Series No. 46.

Funke, Michael and Ralf Ruhwedel (2001), "Export variety and export performance: empirical evidence from East Asia," *Journal of Asian Economics,* Vol. 12 (4), pp. 493-505.

Gamberoni, Elisa (2007), "Do unilateral trade preferences help export diversification? An investigation of the impact of European unilateral trade preferences on the extensive and intensive margins of trade," HEI Working Paper No: 17.

Gorg, Holger, Richard Kneller and Balazs Murakozy (2008), "What makes a successful export? Evidence from firm-product level data," Kiel Institute of World Economy Working Papers, No. 1399.

Grossman, Gene M. and Elhanan Helpman *(*1991*), Innovation and Growth in the Global Economy, (Cambridge, MA: MIT Press).*

Habiyaremye, Alexis and Thomas Ziesemer (2006), "Absorptive capacity and export diversification in Sub-Saharan African countries," United Nations University Working Paper Series No. 2006-030.

Haddad, Mona, Ann Harrison and Catherine Hausman (2010), "Decomposing the great trade collapse: Products, prices and quantities in the 2008-2009 crisis," NBER Working Paper Series No. 16253.

Hammouda, Hakim B., Stephen N. Karingi, Angelica E. Njuguna and Mustapha Sadni-Jallab (2006), "Diversification: toward a new paradigm for Africa's development," Mimeo, Economic Commission for Africa.

Harrigan, James and Egon Zakrajsek (2000), "Factor supplies and specialization in the world economy," NBER Working Paper No.7848.

Hausmann, Ricardo, Jason Hwang and Dani Rodrik (2007), "What you export matters," *Journal of Economic Growth,* Vol. 12, pp. 1-25.

Helpman, Elhanan and Paul Krugman (1985), *Market Structure and Foreign Trade*, (Cambridge, MA: MIT Press).

Hess, Wolfgang and Maria Persson (2011), "Exploring the duration of EU imports," *Review of World Economics*, Vol. 147 (4), pp. 665-692.

Hess, Wolfgang and Maria Persson (2012), "The duration of trade revisited: continuous time vs. discrete-time hazards," *Empirical Economics*, Vol. 43, pp. 1083-1107.

Hillberry, Russell and Christine McDaniels (2002), "A decomposition of North American trade growth since NAFTA," USITC Working Paper 2002-12-A.

Hosein, Roger (2010), "Booming mineral resources and the imperatives of economic diversification," *The West Indian Journal of Engineering*, Vol.32 (1&2), pp.76-84.

Hummels, David and Peter J. Klenow (2005), “The variety and quality of a nation’s exports,” *American Economic Review,* Vol. 95(3), pp. 704-723.

Iacovone, Leonardo and Beata S. Javorcik (2010), “Multi-product exporters: product churning, uncertainty and export discoveries,” *The Economic Journal*, Vol. 120 (544), pp. 481-499.

Imbs, Jean and Romain Wacziarg (2003), “Stages of diversification,” *American Economic Review,* Vol. 93(1), pp. 63-86.

Inter-American Development Bank (2007), “The emergence of new successful export activities in Latin America and the Caribbean,” Mimeo, Research Department Network Project, Inter-American Development Bank.

Internation Monetary Fund (2012a), “Trinidad and Tobago: Selected issues,” IMF Country Report No.12/128.

International Monetary Fund (2012b), *Balance of Payments and International Investment Position Statistics*, (Washington D.C: International Monetary Fund)

Ito, Tadashi (2008), “NAFTA and the extensive margin of Mexico’s exports,” HEID Working Paper No.6, Graduate Institute of International and Development Studies, Geneva.

Jansen, Marion and Kyvik H. Nordas (2004), “Institutions, trade policy and trade flow,” CEPR Discussion Paper No. 4418.

Jaud, Melise, Madina Jukenova and Martin Strieborny (2009), "Financial dependence intensive margin of trade," Working Paper No. 35.

Jaud, Melise, Madina Jukenova and Martin Strieborny (2010), "Finance, comparative advantage and resource allocation," Mimeo.

Jesson, Anneke and Christopher Vignoles (2004), "Trinidad and Tobago: trade performance and policy issues in an era of growing liberalization," Occasional Paper No. 23, of the Institute for the Integration of Latin America and the Caribbean (INTAL) and the Integration, Trade and Hemispheric Issues Division (ITD) of the Inter-American Development Bank (IDB).

Jiang, Shan (2007), "Immigration, information and trade margins," Mimeo.

Kamuganga, Dick (2012), "Does intra-Africa regional trade cooperation enhance export survival?" Mimeo, Graduate Institute of International and Development Studies.

Kanda, Patrick T. and Andre C. Jordaan (2010), "Trade diversion and trade creation: An augmented gravity model study for South Africa," TIPS Small Grant Scheme Research Paper Series, February (2010).

Kaplan, Edward and Paul Meier (1958), "Nonparametric estimation from incomplete observations," *Journal of American Statistical Association*, Vol. 53 (282), pp. 457-481.

Karlsson, Thoman (2011), "Imports, the extensive margin and product variety: Some stylized facts," Mimeo.

Kim, Min-Jun and Chong-Sup Kim (2012), “The effect of trade liberalization on Chile’s export diversity,” *Asian Journal of Latin American Studies,* Vol. 25 (2), pp. 115-134.

Koren, Miklos and Silvana Tenreyo (2007), “Volatility and development,” *Quarterly Journal of Political Economics,* Vol. 122 (1), pp. 243-287.

Krugman, Paul R. (1979), “Increasing returns, monopolistic competition and international trade,” *Journal of International Economics,* Vol. 9 (4), pp. 469-79.

Krugman, Paul R. (1980), “Scale economies, product differentiation and the pattern of trade,” *American Economic Review,* Vol. 70 (5), pp. 950-59.

Krugman, Paul R. (1981), “Intraindustry specialization and gains from trade,” *Journal of Political Economy,* Vol. 89 (5), pp. 959-973.

Lawless, Martina (2010), “Deconstructing gravity: trade costs and extensive and intensive margins,” *Canadian Journal of Economics,* Vol. 43 (4), pp. 1149-1172.

Liapis, Pete (2009), “Extensive margin in agriculture,” OECD Food, Agriculture and Fisheries Working Papers, No.17.

Linnemann, Hans (1966) *An Econometric Study of International Trade Flows* (Amsterdam: North Holland Publishing company).

Luo, Xuexue (2008), “Quantity or variety? An investigation into intensive and extensive margin for WTO countries,” Mimeo.

Maeno, Takaaki (2011) “How big is the extensive margin of trade?: Evidence from Trade Data in Japan,” Mimeo.

Mayer, Thierry and Gianmarco P. Ottaviano (2007), “The happy few: New facts on the internationalization of European firms,” Bruegel-CEPR 2007 Report, Bruegel Blueprint Series.

McGuire, Gregory, Dennis Pantin, Dale James and Navin Seeteram (2008), “A guide for monitoring the management of oil and gas in Trinidad and Tobago,” Mimeo, Report of the Sustainable Development Network (SDN) of Trinidad and Tobago.

Melitz, Marc J. (2003), “The impact of trade on intra-industry reallocations and aggregate industry productivity,” *Econometrica,* Vol. 71 (6), pp. 1695-1725.

Moncarz, Pedro E. (2010), “Argentina’s import patterns: trade preferences and the extensive margin of trade,” *Journal of Economic Policy Reform*, Vo. 13 (1), pp. 61-85.

Moons, Selwyn (2012), “What are the effects of economic diplomacy on the margins of trade?” *International Journal Diplomacy and Economy*, Vol. 1 (2), pp. 147-162.

Murakozy, Balazs and Gabor Bekes (2009), “Temporary trade,” Discussion Paper No. 9, Institute of Economics, Hungarian Academy of Sciences.

Naude, Wim and Riann Rossouw (2008), “Export diversification and specialization in South Africa: extent and impact,” Mimeo.

Newfarmer, Richard and Paul Brenton (2007), “Watching more than the discovery channel: Export cycles and diversification,” Policy Research Working Paper No.4302.

Nicita, Alessandro, Miho Shirotori and Bolormaa T. Klok (2011), “Survival analysis of LDC’s exports: role of comparative advantage,” Policy Issues in International Trade and Commodities Study Series No. 55, United Nations Conference on Trade and Development, New York.

Nicita, Alessandro and Bolormaa Tumurchudur-Klok (2011), “New and traditional trade flows and the economic crisis,” United Nations Conference on Trade and Development (UNTAD), Policy Issues in International Trade and Commodities Study Series No.49.

Nitsch, Volker (2009), “Die another day: Duration in German import trade,” *Review of World Economics,* Vol. 145(1), pp. 133-154.

Obashi, Ayako (2008). "Stability of production networks in East Asia: duration and survival of trade,” Mimeo.

Oguledo, Victor and Craig R. Macphee (1994), “Gravity models: A reformulation and an application to discriminatory trade arrangements,” *Applied Economics*, Vol. 26 (2), pp. 107-120.

Ohlin, Bertil (1933), *Interregional and International Trade* (Cambridge, MA: Harvard University Press).

Pantin, Dennis (1980) "The plantation economy model and the Caribbean," *IDS Bulletin*, Vol. 12(1), pp. 17-23.

Papke, Leslie E. and Jeffrey M. Wooldridge (1996), "Econometric methods for fractional response variables with an application to 401(K) plan participation rates," *Journal of Applied Econometrics*, Vol.11, pp. 619-632.

Parteka, Aleksandra (2007) "Employment and export specialization patterns versus GDP per capita performance-unifying approach," Working Paper No.302, Paper presented at the Warsaw International Economic Meeting (WIEM, Warsaw, July 2007).

Parteka, Aleksandra and Massimo Tamberi (2008), "Determinants of export diversification: An empirical investigation," Paper presented at the Warsaw International Economic Meeting (WIEM, Warsaw, 5-6 July 2008) and at the European Trade Study Group Meeting (ETSG Warsaw 11-13 September 2008), Quaderni Di Ricerca No. 327.

Pelzman, Joseph and Gregory K. Schoepfle (1988) "The impact of the Caribbean Basin Economic Recovery Act on Caribbean nations' exports and development," *Economic Development and Cultural Change*, Vol. 36 (4), pp. 753-796.

Persson, Maria (2008), "Trade facilitation and the extensive and intensive margins of trade," Paper presented at the Eleventh Annual Conference on Global Economic Analysis in Helsinki, June 2008.

Pierce, Justin R. and Peter K. Schott (2012), "Concording U.S harmonized system codes over time," *Journal of Official Statistics*, Vol. 28. (1), pp. 53-68.

Plumer, Thomas and Michael Graff (2001), "Export specialization and economic growth," *Review of International Political Economy*, Vol. 8(4), pp. 661-688.

Prebish, Raul (1950), "The economic development of Latin America and its principal problems," United Nations.

Ramalho, Esmeralda A., Joaquin J. Ramalho and Jose M. Murteira (2011), "Alternative estimating and testing empirical strategies for fractional regression models," *Journal of Economic Surveys*, Vol. 25 (1), pp. 19-68.

Rauch, James E. (1996), "Trade and search: social capital, sogo shosha, and spillovers," NBER Working Paper No. 5618.

Rauch, James E. (1999), "Networks versus markets in international trade," *Journal of International Economics*, Vol. 48, pp. 7-35.

Rauch, James E. and Joel Watson (2003), "Starting small in an unfamiliar environment," *International Journal of Industrial Organization*, Vol. 21, pp. 1021-1042.

Ricardo, David (1817), *The Principles of Political Economy and Taxation,* (London: John Murray).

Romer, Paul (1990), "Endogenous technical change," *Journal of Political Economy*, Vol. 98 (5), pp. 71-102.

Rose, Andrew K. (2004), "Does the WTO really increase trade," *American Economic Review*, Vol. 91(1), pp. 98-114.

Rose, Andrew K. (2007), "The Foreign Service and foreign trade: Embassies as export promotion," *The World Economy*, Vol. 30 (1), pp. 22-38.

Sadikov, Azim (2008), "External tariff liberalization in CARICOM: A commodity-level analysis," IMF Working Paper No. WP/08/33.

Samen, Salomon (2010), "A Primer on export diversification: key concepts, theoretical underpinnings and empirical evidence," Mimeo, World Bank Institute.

Sandberg, Mikael H., James L. Seale Jr, Timothy G. Taylor (2006), "History, regionalism and CARICOM trade: A gravity model analysis," *Journal of Development Studies*, Vol. 42 (5), pp. 795-811.

Sandrey, Ron and Dirk van Seventer (2004), "Has the New Zealand/Australian Closer Economic Relationship (CER) been wrade Widening or deepening?" African Development and Poverty Reduction: The Macro-Micro Linkage Forum Paper 13-15 October 2004, South Africa.

Sanguinetti, Pablo, Juan Pantano and Josefina Posadas (2004), "Regional integration and trade diversification in South-South Agreements: Evidence from Mercosur," Mimeo.

Saviotti, Pier P., and Koen Frenken (2008), "Export variety and the economic performance of countries," Journal *of Evolutionary Economics*, Vol. 18 (2), pp. 201-218.

Seers, Dudley (1963), "The limitations of the special case," *Oxford Bulletin of Economics & Statistics*, Vol. 25(2), pp. 77-98.

Segura-Cayuela, Ruben and Josep M.Vilarrubia (2008a), "The effect of Foreign Service on trade volumes and trade partners," Documentos de Trabajo No. 0808.

Segura-Cayuela, Ruben and Josep M.Vilarrubia (2008b), "Uncertainty and entry into export markets," Banco de España Working Paper No. 0811.

Shepherd, Ben (2010), "Geographical diversification of developing country exports," *The World Development,* Vol. 38(9), pp. 1217-1228.

Shikher, Serge (2010), "Determinants of specialization and the role of trade costs," Mimeo.

Silva, Joao S. and Silvana Tenreyro (2006), "The log of gravity," *Review of Economics and Statistics,* Vol. 88 (4), pp. 641-658.

Sinanan, Damie and Roger Hosein (2012), "Transition probability matrices and revealed comparative advantage persistence in a small hydrocarbon-based economy," *The West Indian Journal of Engineering*, Vol. 34(1), pp. 16-29.

Singer, Hans (1950), "The distribution of gains between investing and borrrowing countries," *American Economic Review*, Vol. 40(2), pp. 473-485.

Stirbat, Liviu, Richard Record and Konesawang Nghardsaysone (2011), "Exporting from a small landlocked economy: An assessment of firm-product-destination survival rates in the Lao PDR," World Bank Policy Research Working Paper No. 5695.

Taylor, Timothy G. (2007), "Export diversification in Latin America and the Caribbean," *Journal of the Caribbean Agro-Economic Society (CAES),* Vol. 7(1), pp. 157-175.

Thoumi, Francisco (1989), "Trade flows and economic integration among the LDCs of the Caribbean basin," *Social and Economic Studies,* Vol. 38 (2), pp. 215-233.

Thu, Nguyen, A. (2010), "Impact of export variety on productivity in Japan," *Vietnam National University Journal of Science, Economics and Business,* Vol. 28, pp. 47-59.

Tovar, Jorge and Luis R. Martinez (2011), "Diversification, networks and the survival of exporting firms," Faculty of Economics, Universidad de los Andes, Working Paper Series No. 08.

Van Biesebroeck, Johannes, Emily Yu and Shenjie Chen (2011), "The impact of trade promotion services on Canadian exporter performance," CEPR Discussion Paper No. 8597, Center for Economic Policy Research, London.

Venables, Anthony J. and Nuno M. Limao (2002), "Geographical disadvantage: a Hecksher-Ohlin-von Thunen model of international specialization," *Journal of International Economics*, Vol. 58 (2), pp. 239-263.

Vernon, Raymond (1966), "International investment and international trade in the product cycle," *Quarterly Journal of Economics*, Vol. 80(2), pp. 190-207.

Vogiatzoglou, Klimis (2009), "Determinants of export specialization in ICT products: A cross-country analysis," Centre for Planning and Economic Research, Division of International Economics, Athens, Greece, Working Paper No.3.

Vople-Martincus, Christian and Jeronimo Carballo (2008), "Is export promotion effective in developing countries? Firm-level evidence on the intensive and extensive margins of exports," *Journal of International Economics*, Vol. 76 (1), pp. 89-106.

Volpe-Martincus, Christian and Jeronimo Carballo (2009), "Survival of new exporters in developing countries: does it matter how they diversify?" Inter-American Development Bank (IDB) Working Paper No.140.

Volpe-Martincus, Christian and Sandra M. Gomez (2009), "Trade policy and export diversification: What should Colombia expect from the FTA with the United States," Inter-American Development Bank (IDB) Working Paper No. 136.

Volpe-Martincus, Christian and Jeronimo Carballo (2010), "Entering new country and product markets: does export promotion help?" *Review of World Economy*, Vol. (146), pp. 437-467.

Volpe-Martincus, Christian, Antoni Estevadeordal, Andres Gallo and Jessica Luna (2010a), "Information barriers, promotion institutions, and the extensive margin of trade," IDB Working Paper Series No.IDB-WP-200.

Volpe-Martincus, Christian, Antoni Estevadeordal and Andres Gallo (2010b), "The impact of export promotion institutions on trade: Is it the intensive or the extensive margin?" IDB Working Paper Series No.IDB-WP-199.

Wagner, Joachim (2011), "Exports, imports and firm survival: first evidence for manufacturing and enterprises in Germany," Discussion Paper No. 5924 of the Institute for the Study of Labour (IZA).

Wakasugi, Ryuhei (2009) "Why was Japan's trade hit so much harder," Mimeo.

World Bank (2008), *Accelerating Trade and Integration in the Caribbean: Policy Options for Sustained Growth, Job Creation, and Poverty Reduction* (Washington D. C: World Bank).

World Bank (2010), *Worldwide Governance Indicators*, (Washington D.C: World Bank)